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Railway Age

SECOND HALF OF 1924—No. 21 NEW YORK—NOVEMBER 22, 1924—CHICAGO SIXTY-NINTH YEAR

Published Weekly by Simmons-Boardman Pub. Co., 30 Church St., New York, N. Y. Subscription Price U. S., Canada and Mexico, $6.00; foreign countries (excepting daily editions), $8.00, and $10.00 a year including all dailies; single copies, 25c. Entered as second-class matter January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

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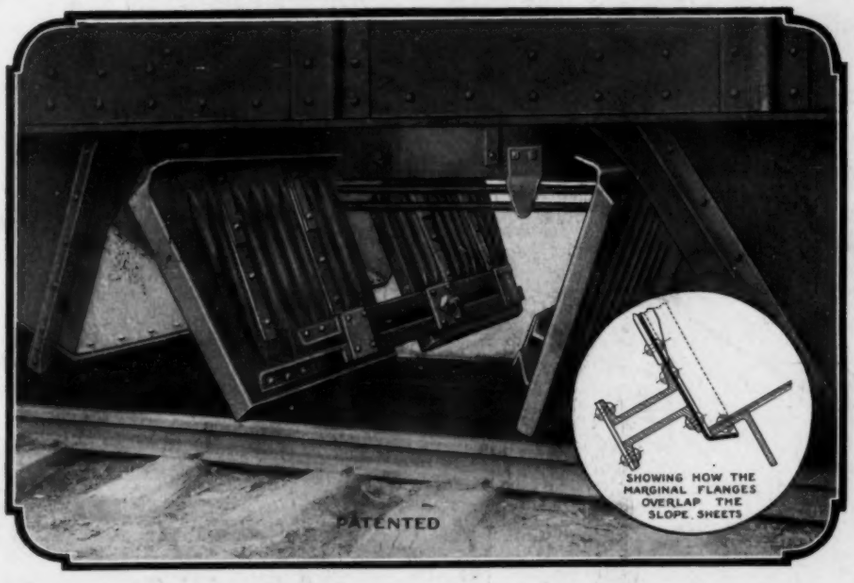

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EDITORIAL

Railway Age

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Co-operative Railway Education

The Central of Georgia Railway and the Georgia School of Technology have made considerable progress in the development of co-operative engineering courses in the mechanical, electrical and signaling fields, as described elsewhere in this issue. One point is deserving of special emphasis, and that is, that ambitious young men who desire a college education and training, but are not financially able to take the ordinary college courses, can pay a large part of their expenses from their earnings while working for the railway in the co-operative courses. It is estimated that probably as high as 90 per cent of the young men who are enrolled in the co-operative courses would be debarred from a college education were it not for this opportunity of becoming at least partly self-sustaining. It must be understood, also, that the colleges in the south are not as well equipped with loan funds, scholarships and other means of aiding young men who find it necessary to work their way through college. There is little question but that in most cases the young man who finds it necessary to earn part or all of his way through college, appreciates his education more than the young man whose parents finance it entirely. Young men who make a real sacrifice to obtain an education are less inclined to waste their time. Moreover, the practical experience which the "co-ops" receive in industry enables them, while they are students, to recognize the real value of their college work, since they can better appreciate how the mental training and theory which they are receiving is to be applied in a practical way. The experience of such colleges as have used the co-operative plan is that the "co-op" students approach their college work in a much more serious frame of mind and appear to appreciate it to a much greater extent than do the students who take the standard courses.

An Opportunity to Help the Boys

The second annual conference of the younger railroad men, held at Detroit last week, proved to be a most impressive gathering. The boys and young men came from all parts of this country and Canada, and, carefully selected as they were, followed the proceedings and participated in the discussions with a keen and intelligent interest. They were there for business and to get as much from the conference as possible. All of them will go back home with higher aims and ideals and a larger appreciation of the importance of the transportation industry and their relation to it. Many of them will take positions of leadership in helping their companions, who were not so fortunate as to attend the meeting, to recognize the opportunities that lie before them, as well as the responsibilities which rest upon them in preparing to meet the larger problems in the transportation field, and as citizens of the future. A practical outcome of the first conference which was held at St. Louis a year ago was the formation of a number of American Railway Employed Boys' Clubs, or AREB Clubs, as they are called. Many of the boys after the first conference also gave talks before local civic clubs, such as the Rotary, Kiwanis and Chamber of Commerce, telling their impressions of the conference. This year one of the railroad clubs has already indicated its intention of having one or more of these young men take part in one of its monthly programs, in order that the club members may get a better idea of how to be of assistance to the boys and young men in helping and inspiring them to make the best use of their talents. Railroad officers and foremen have an opportunity of helping these younger men in a number of ways. Many of the men who came in contact with the young men at the first conference, went back home with the determination to help the boys at their local points to make the most of themselves and their opportunities, and they demonstrated in no uncertain way in several instances what a little intelligent interest along this line will accomplish. The boys are anxious to learn the "why" of their jobs and to get a better understanding of the relationship of their work to the operation of the railroad. They desire, also, to understand the relationship and importance of railroading to the economic, social and political structure of our country and what it means to its continued prosperity and development. A knowledge of these things will inspire them to more intelligent effort, will strengthen their loyalty and develop them for larger responsibilities in the future.

Applying Psychology to Industry

The Russell Sage Foundation, which is making exhaustive studies in the problem of employment, in report recently made public says: "A great deal of quackery is being exercised in the technique of selecting applicants for employment, and the greater part of the experimentation—scientific and otherwise—that has been carried on in regard to the selecting of workers is still comparable to the 'home remedies' stage of medicine and surgery." Business in general has learned that a knowledge of the science of economics is helpful to it, making possible the replacing of "hit-and-miss" methods with scientifically planned programs. The consequence is that in many important enterprises economists of great ability will be found in high positions. But all the problems of business will not be solved merely by the utilization of sound economic knowledge. Speakers have variously estimated the railroad industry at from 50 to 100 per cent human, and the ratio of humanity in most other business is probably not less great. Economic laws of necessity must work through human beings and human beings are moved to action by many motives besides the economic. A thorough knowledge of the science of psychology and its application to industry, therefore, holds forth as great a promise for improvement as does a wider use of the findings of economic science. Industry feels this need, perhaps unconsciously, as is demonstrated by the fact that it will support the kind of activity characterized as quackery by the Russell Sage Foundation. Most employers have some idea of what their employees want. Perhaps what they want is something which seems impossible to give them and the hope of avoiding perpetual conflict may appear remote indeed. But is the outlook so dark? What do men really want anyhow, and could they tell you what it is? The economists of late years who have brought the great advance in the science have done so largely by subjecting their theories to statistical analysis, thereby making economics more and more an experimental science like physics or chem-

istry and removing it from the speculative field as a branch of philosophy. Psychologists too are depending more and more on experiment—in other words becoming more scientific and less purely speculative. When the time comes that industry begins the same application of sound psychology as it already has sound economics the problem of human relations will begin to appear less perplexing. A successful leader of a great industrial enterprise must be a successful practical economist and a successful practical psychologist as well. We can check up his actions from an economic standpoint and use them as a guide for our own economic conduct. Could his actions not also be as profitably studied from a standpoint of psychology?

The Importance of Obsolescence

The importance of obsolescence as a factor in the retirement and reconstruction of engineering structures is illustrated in a striking manner in the renewal by the Chicago & North Western of its bridge across the Missouri river at Blair, Neb., as described by O. F. Dalstrom, bridge engineer of that road, in an article which appears on another page of this issue. This structure was built in 1882-3 and had, therefore, been in service 40 years. It was so well built and maintained that inspection showed no evidences of deterioration and there were no indications on which to base the ultimate life of the structure. Yet it has just been rebuilt at heavy expense because it had become a barrier to the economical operation of the road as a whole. While still as good as the day it was built, the weight of the locomotives and cars now in service have increased to such an extent that the structure was too light for these loads and it had to give way to a more modern and heavier bridge. This is characteristic of many units of railway construction which, if properly maintained, show little or no evidences of wear but which must give way just as truly as if they wore out. Such replacements constitute just as much of a tax on railway operation as those which are made necessary by wear under traffic or the action of the elements and they must be recognized and provided for by the managements to the same extent as the others. Predictions have been made since the earliest days of railroads that the limit in railway loadings has been reached. Yet this development continues and there is no reason to believe that the present structures will differ from their predecessors in their fate in this respect. Transportation is a developing industry and the structures which make transportation possible must develop with it.

Railway Clubs Improve Programs

RAILWAY CLUBS have always been highly regarded because of the educational value of their papers and addresses and the fact that they have promoted acquaintanceship between men performing the same class of work on different railroads or between men engaged in different departments on their own or other railroads. These contacts have made the clubs informal clearing houses for the best methods and practices in the regions which they serve and have also helped to develop a greater degree of teamwork; for instance, a man occupying an important position in one department first met and came in contact with men in related departments on the same railroad through attendance at the railroad club meetings. It is true that the individual railway clubs have had their "ups and downs," but in general they have made a large contribution to railway progress in many ways. Today they are functioning more actively than ever before and with a greater recognition of their possibilities for service.

Several of the clubs are demonstrating in a most forceful way that they can get out of a rut and adapt their programs to changing conditions. The Central Railway Club may be cited as one example. A Welfare Committee has been functioning with the intent of increasing the membership to 1,000 and of improving the club activities in such a way as to assimilate the new members and render a larger service to the membership as a whole. As this committee became more and more interested in increasing the membership and as it neared its goal, it was more and more impressed with the fact that there were a number of ways in which the club might function to greater advantage and the Executive Committee has found this committee to be a most fruitful source of helpful and constructive suggestions. For instance, a committee has just been appointed to study how the club proceedings may be improved and made more attractive, in order to reach the large number of members who for various reasons cannot always get to the meetings—the average meeting is not attended by more than 25 per cent of the active members. A survey has indicated that only an exceedingly small proportion of the members take part in the open forum discussions which follow the presentation of papers or addresses. It was therefore decided that the next meeting of the club will be designated as "Amateur Night" and that the first dozen or so men who discuss the paper which is to be presented must be from those who have not heretofore taken part in any of the club discussions. Naturally this will mean that some difficult advance work will have to be done to assure the success of this feature, but the possibilities of developing dormant talent and of awakening a more intelligent interest on the part of many of the members are very great. It is the intention also to have what is known as a "Boys' Night," when a distinct effort will be made to bring out the boys and younger men, with a program which will appeal to them and which will possibly be largely in their hands. This will not only be a distinct encouragement to the younger men, but will help to develop the railway club leaders of the future. These are some of the good things that are being contemplated, by the Central Railway Club, which can undoubtedly be used by similar organizations in other parts of the country.

Railway Taxes Still Increasing

NOTHING APPARENTLY can stop the increase of railway taxes. Whether traffic and earnings increase or decrease, whether the net return earned by the roads advances or declines and regardless of what views are expressed or conclusions reached concerning the value of their property the taxes they are required to pay continue to mount.

Railway taxes made a new high record in September. They were $33,586,622. This was $4,381,290 or over $140,000 a day more than in September, 1923.

In the first nine months of 1916 before any general advance in rates had been made railway taxes averaged $425,271 a day. In the first nine months of 1923 they were $909,587 a day. In the first nine months of 1924 they were $929,262 a day, an increase over 1916 of almost $504,000 a day.

Between September, 1920, and September, 1924, the railway managements reduced operating expenses $4,300,000 a day. In September, 1920, taxes were $807,795 a day and in September, 1924, they were $1,119,887 a day, an increase of over $312,000 a day.

The public owes the large reductions in rates that have been made since they reached their peak in 1920 to increased economy and efficiency of railway operation. While the expenses of railway operation have been greatly reduced, the expenses of government, or at least that part of them which is paid from railway taxes, have continued to increase. While railway operating expenses have been reduced almost 25 per cent within the last four years, railway taxes have been increased over 35 per cent.

The public which regulates the railways also is supposed to control the conduct of its governments. Why does it not insist upon that economy in its governments, especially those of its states and counties, upon which it insists in the management of the railroads?

The Howell-Barkley Bill

IF THE VOTE at the recent national election expressed the sentiment of the people regarding the Howell-Barkley bill, it indicated that an overwhelming majority are opposed to it. Nevertheless, it appears certain that Congress in its coming session will be urged by the labor leaders to pass this or some similar measure.

The principal argument that has been advanced for the abolition of the Railroad Labor Board and the passage of the Howell-Barkley bill is that the Labor Board, under the provisions of the Transportation Act, applies "coercion" in settling disputes between the railways and the employees. There should not, it is contended, be any "coercion" used by the public through the government to bring about the settlement of disputes between employers and employees. All their negotiations and settlements should be "voluntary".

There is a plain inconsistency between the provisions of the Howell-Barkley bill and the advocacy of the principle of "voluntary" settlements. The Howell-Barkley bill would establish four national adjustment boards, the membership of which would be composed equally of representatives of the national labor unions and the railways. The railroads do not want these boards established. They do not want to be represented on them. How can members of Congress be so illogical as to support the theory of "voluntary" settlements by arguments in favor of a bill which would force the railways to be represented on these boards?

The bill would also indirectly apply force to railway employees who do not belong to the national labor unions. Only employees belonging to the national unions would be represented on the boards. Therefore, employees who do not belong to the national unions would be forced either to go without representation or to join the national unions. If they all joined the national unions the railways would have the closed shop forced upon them.

Arguments for the Howell-Barkley bill assume that there is not and cannot be true collective bargaining under the labor provisions of the Transportation Act. This assumption is directly contrary to the facts. The Transportation Act expressly requires the railways and their employees to try to settle all disputes in conferences between themselves. The negotiations carried on in these conferences constitute true collective bargaining. Many disputes have been settled in this way since the Labor Board was created. No dispute can be carried to the Labor Board until it has been the subject of collective bargaining, and until the failure of collective bargaining has resulted in a disagreement which may lead to an interruption of transportation—in other words, to a strike.

The only way the Labor Board after that can apply "coercion" is by compelling the representatives of the railways and employees to appear before it and in public hearings present the facts, as they understand them, regarding the matters in controversy. After the hearings have been held the Board renders a decision setting forth its conclusions as to the facts and as to what settlement should be made. Its award is not, however, binding on either party. The only "coercion" that can be applied to enforce it is the "coercion" of public sentiment.

As a substitute for having hearings conducted and awards made by the Labor Board it is proposed virtually to restore the plan of mediation and arbitration which was formerly applied by the Newlands Act to disputes between the railways and the train service employees. It has been argued in Congress that the Newlands Act and its predecessor, the Erdmann Act, for years maintained almost complete peace between the railways and the train service employees. Representative Rathbone of Illinois so claimed in a speech he made at the last session of Congress and which he distributed as a political campaign document. It is a remarkable fact, that Mr. Rathbone was unaware of or ignored two very important events which occurred while the Newlands Act was in effect and which demonstrated the complete breakdown of that law.

In 1915 there was a wage dispute between the western railways and their engineers and firemen. This dispute was finally submitted to arbitration under the Newlands Act. A tripartite arbitration board was voluntarily organized by the railways and the employees. It consisted of two representatives of the railways, two representatives of the employees and two supposedly impartial arbitrators, these being Judge J. C. Pritchard of the United States District Court and Charles Nagel of Illinois, formerly Secretary of Commerce. The wage award made was unsatisfactory to the labor leaders. They attributed the outcome principally to Mr. Nagel, and although they had accepted him as an arbitrator they subsequently attacked him as unfair and said his alleged unfairness was due to the fact that he represented interests that owned railway securities. They publicly announced then that they would not again agree to arbitration under the Newlands Act. They claimed experience had shown that it was impossible to get umpires who were impartial and who knew enough about railway matters to pass intelligently upon railway labor disputes.

Soon afterward the leaders of the train service unions started the movement for the so-called "basic eight hour day". Negotiations between them and the Conference Committee of Managers representing the railways proved fruitless. The Federal Board of Mediation and Conciliation, which under the Newlands Act was precisely similar to the Board of Mediation and Conciliation which would be established by the Howell-Barkley bill, intervened, but could not bring about an agreement. The railways offered to arbitrate under the Newlands Act, but this the labor leaders refused to do. The dispute was carried to the White House and President Wilson tried to effect a settlement. The railways repeatedly offered to arbitrate in any way that President Wilson might suggest. The president said he could not get the labor leaders to arbitrate. The result was that the labor leaders ordered a strike and Congress in great haste passed the Adamson Act to prevent it.

In view of this indisputable record, how can any man believe that, if the mediation and arbitration provisions of the Newlands Act were virtually re-established by the passage of the Howell-Barkley bill, important labor disputes on the railways would be settled by peaceful methods?

The railways have been criticised because they have refused to try by negotiations with the labor leaders to secure an agreement upon a bill which might be presented to Congress as representing the views of both sides. The railways have not forgotten the history of the Erdmann and Newlands Acts. Both of these acts were agreed upon by the railway managers and labor leaders and passed by Congress at their joint suggestion. The railways were always willing to have mediation and arbitration under them. It was the labor leaders who repudiated them. The railway managers therefore have good reason for believing that the labor leaders would repudiate any law to whose passage the railways and they might agree if the labor leaders decided that from their point of view it was expedient to repudiate it.

What the labor leaders want and do not want is quite plain to those who are familiar with the history of railway labor disputes. They want legislation which will practically force railway employees who do not now belong to the national labor unions to join them. They want legislation which will force the railways to be represented upon national

boards of adjustment in order that uniform working conditions may be forced upon the roads throughout the country. They want legislation under which they can refuse to arbitrate when they think they can gain more by other means. They do not want a law, such as the present one, which gives the public a voice in the settlement of labor disputes, and under which one governmental agency determines what are fair wages and working conditions in the railroad industry and another determines what are fair rates. They desire to deprive the railways of the opportunity, which they now have, of defending their rates upon the ground that they are made necessary principally by the wages they have to pay, and that these wages, like the rates, are fixed by governmental agency.

The labor provisions of the Transportation Act are not perfect and the Labor Board has not always shown wisdom in interpreting and applying them. But the present system of settling labor disputes is much fairer to the railways, the employees and the public, and much better adapted to maintaining industrial peace, than that contemplated by the Howell-Barkley bill or any other legislation which has been proposed.

Fighting Ice in November

THE RAILWAYS in many of the northern states have had their first touch of cold weather during the past week. While not severe in itself, this experience is a warning of the winter that is almost upon us. Its severity cannot be foretold at this time, but it is certain that the ability of the roads to move traffic without interruption will be taxed at some time during the next four months. The problem now is to see that all precautions which can be taken in advance are adopted so that the minimum will be left to be done when the emergency arises.

Since it falls to the lot of the maintenance of way forces to keep the tracks open for traffic, the primary responsibility for continuity of operation rests on them. Their problem is difficult on the line in the open country, but it is particularly so in the terminals where train movements are more frequent and switches and interlocking plants more numerous. The overhauling and assembly of plows, flangers and other snow fighting equipment and its location where it is readily accessible to the most likely points of attack is a primary precaution. The assembly of smaller equipment, such as snow brooms, melters, etc., is also essential. Even more vital is the perfection of a plan of organization to cope with the most severe storms which past experience has indicated may reasonably be anticipated and the instruction of every man in this organization as to his duties. The development of a plan for an organization sufficiently large to direct the work of such temporarily recruited forces as may be necessary is vital, as are measures for the comfort and feeding of these men when at work.

Closely allied with these precautions are those to insure that important water lines are protected from frost, that windows are repaired and that all buildings in which men are employed are put in shape to enable them to work with comfort. The protection of roundhouses and turntables against blockade is particularly important for they constitute the heart of a terminal.

The responsibility of the mechanical department is scarcely less important. The standards of maintenance of locomotives must be such as to insure that engines are in proper condition to cope with low temperatures and with sleet and ice when on the road for long periods of time. An engine failure interrupts the orderly movement of traffic at any time, but it is particularly serious in cold weather when every step in train operation is confronted with special handicaps.

What is true of the maintenance of way and mechanical departments is true in degree of every other department involved in the movement of traffic for it is equally important that these branches of the service take adequate measures before the cold weather places an extra tax on the entire transportation organization. No single step can do more to reduce this tax and the severity of this added burden than its anticipation at this time. The most successful fighting of the snow storms of January and February can be done in October and November by adequate planning to combat these storms in advance. It is by such measures that emergencies cease to be emergencies and merely become periods of special effort. It is not too late to check the precautions which have been taken to cope with the winter to insure that all reasonable measures have been adopted.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Biennial Census of Manufactures, 1921. Compiled by U. S. Bureau of the Census. "Railroad Repair Shops" are Group 13. Locomotives are included in Group 3, "Iron and Steel," Cars under Group 12, "Vehicles for Land Transport." 1625 p. Pub. by Govt. Print. Off., Washington, D. C. $1.75.

The Book of the Locomotive, by G. Gibbard Jackson. A history of locomotives, and railroads of Gt. Brit. 244 p. Illustrated. Pub. by Longmans, Green & Co., London and New York. $2.00.

A Brief List of References to Material on Sleeping-Car Service in European Countries. 6 p. Issued by Library, Bureau of Railway Economics, Washington, D. C.

Capital and Steam Power, by John Lord. Effect of introduction of steam power, 1,750-1,800, in engineering and coal-mining, and other industries. 242 p. Pub. by P. S. King & Son, Ltd., London, England. 7 shillings, sixpence.

Motive Power Development on the Pennsylvania Railroad System, 1831-1924, by Paul T. Warner. Reprinted from Baldwin Locomotives, 80 p. Illustrated. Pub. by Pennsylvania Railroad System, Philadelphia, Penna.

The Role of the State in the Provision of Railways, by H. M. Jagtiani. With foreword by Sir Wm. Acworth. Considers development of railways in England, Prussia, and India. No. 73 in series of monographs on economics and political science by writers connected with London School of Economics and Political Science. 146 p. Pub. by P. S. King & Son, Ltd., London, Eng.

Periodical Articles

Billion Equipment Trusts Issued. Something of the history and provisions of equipment trusts. United States Investor, Nov. 15, 1924, p. 9-11.

A Coming Crisis—Congress and Railroad Labor, by Walter Gordon Merritt. Analysis of Howell-Barkley bill. Law and Labor, November, 1924, p. 296-299.

The Economic Lesson of the Election. "Full advantage will not be taken unless the repudiation of political interference with the railroads and the Federal Reserve System is adopted as a national policy." Annalist, Nov. 10, 1924, p. 477.

The Mexican Railway, by W. R. Long, Historical sketch. Commerce Reports, Nov. 17, 1924, p. 416-417.

Millions Being Invested in Bolivian Oil Field, by Nelson Rounsevell. Existing means of transport, principally mules, described, and proposed railroad routes and connections discussed. Bull. of the Pan American Union, Nov. 1924, p. 1110-1119.

Locomotive Repair Shop at Macon—Central of Georgia Railway

Co-operative Railway Engineering Courses

Central of Georgia Railway and Georgia School of Technology Working Out Ambitious Program

DR. HERMAN SCHNEIDER of the University of Cincinnati, Ohio, many years ago inaugurated what is known as co-operative engineering education. Conditions were favorable for such courses at Cincinnati and after a long and thorough trial the scheme was found to be a big success. The idea was gradually taken up at other places, varying the application of the plan to suit the local or special conditions. Some attempts were made on a small scale to apply it to different branches of railway engineering, but not with any great degree of success. The Georgia School of Technology offered courses in co-operative engineering as early as 1912, but it was not until a year or two ago that it enlisted the interest of the Central of Georgia. Today that railway has 74 co-operative students in the mechanical, electrical and signal departments.

The standard engineering courses of the Georgia School of Technology, as at most other engineering colleges, cover four years. The students in these courses have a certain amount of shop or field work in the college and have the usual long summer vacations. When graduated they find it necessary to begin at the very bottom of the ladder in the industries—in other words they are long on theory and short on practice. It is rather discouraging to many of these young men to have to start in at the same place as the regular apprentices who are four or five years younger.

The co-operative engineering courses, on the other hand, are planned to allow the students to alternate at short intervals between the college and the shop; they require five years, or a year longer than the standard engineering courses. The co-operative engineering students also work 11 months a

Co-operative Students at the Savannah, Ga., Shops

year, instead of nine, shortening the summer vacation from three months to two weeks.

What does this accomplish? Several things. The student gets the practical work along with the theory and mental training and is better able to understand and appreciate both. It tests the boys out early; they soon find whether or not they are fitted for engineering work. If not, they can transfer to some other course for which they are better suited, thus saving time and unnecessary expense for both the student and the institution. The co-operative student or "Co-op," as he is called, earns money one-half the time, thus making it possible for many young men to go to college who would otherwise not be able to finance their courses. They are paid 32 cents an hour for the first six months; this is increased two and a half cents an hour at intervals of six months. The co-operative courses practically double the capacity of the college, since twice as many boys can be accommodated with the same equipment in any one college year, one-half being in the college, while the other half is in the shop. This statement must, of course, be modified somewhat since the co-operative course is five years long instead of four. When the co-operative student is graduated he has a splendid practical and theoretical training and can hold down a responsible position, rather than having to start at the bottom of the ladder.

The Georgia School of Technology at Atlanta

It is necessary for the college to remain open for the greater part of the summer, thus necessitating special arrangements with those faculty members who have the co-

A Group of the Central of Georgia Co-operative Students on the Campus of the Georgia School of Technology

operative students in charge. Our colleges and universities represent vast investments and from the economic point of view it is advisable to have them function throughout the entire year, thus keeping the investment working continuously. The continuity of shop operation is not affected, since each student has an alternate who replaces him in the shop when his partner returns to the college, or when he takes his vacation.

To become a co-operative student on the Central of Georgia it is first necessary to meet the entrance requirements of the Georgia School of Technology. These are rather severe and up to the standards of the best engineering schools. They may well be so, for while the college has 90 co-operative sophomore students out of a total of 450 in that class, and 120 co-operative students in the freshman class out of a total of 650, it has been forced to turn away several hundred applicants for entrance in the co-operative engineering courses. If after a student has been accepted by the Georgia School of Technology, he wishes to enter the service of the Central of Georgia as a co-operative student, he must pass a physical examination and meet the other requirements of the railroad.

In general, the young men alternate between the college and the shop at intervals of four weeks. It is necessary to modify this arrangement somewhat at certain times of the year to provide for the college examinations and allow each student to have one week of vacation at Christmas or New Year, and two weeks' vacation during the summer months. This is so arranged, however, that there is a normal force in the shops at all times. Experience at the Georgia School of Technology and other places where co-operative engineering courses have been tried, indicates that although the co-operative engineering students have about two and a half years of shop experience in their five-year course, they cover practically as much theory, and far more intelligently, than do those in the four-year standard engineering courses. The work in the shop gives them the much needed practical experience and develops their physique; their contact with the work shop and industry gives them a better poise and more ease and assurance than is true of the average college student. The courses in the practical work on the railroad are designed to familiarize the boy with the work of the department in which he is enrolled and to give him a good all-around training in its methods and prac-

A Number of the Co-operative Students Work in the Machine Shop at Macon

Co-operative Students at the Macon, Ga., Shops

tices. Incidentally, also, the co-operative students at Georgia Tech are giving a good account of themselves in the college activities and athletics, in spite of their absence from the college one-half the time, and the fact that their shop work is often far removed from the college, or even Atlanta.

Although the Central of Georgia has only entered the second year of its experiment with the co-operative plan, it has co-operative engineering students covering four college years. This is because several students who started their co-operative work in other industries three or four years ago, have been transferred to the Central of Georgia. There are now four boys in the fourth or junior year, eight in the third

CENTRAL OF GEORGIA RAILWAY COMPANY

Report on Co-Operative Students

Name of Student _____ Date _____

Name of Student's Alternate _____

Characteristics	A 90 - 100 Exceptionally Good	B 80 - 89 Above Average	C 70 - 79 Average	D 60 - 69 Below Average	E Below 60 Exceptionally Poor
Interest in Work	Enthusiastic	Quite interested	Average interest	Lacks interest	Disinterested
Application	Very industrious	Good worker	Steady	Erratic	Lazy
Ability to learn	Very quick to learn	Apt	Learns readily	Slow to learn	Dense
Self reliance	Excellent	Self reliant	Confident	Lacks confidence	Timid
Accuracy	Exceptionally accurate	Accurate	Average	Inaccurate	Careless
Speed	Very rapid	Rapid	Average	Slow	Very slow
Reliability	Trustworthy	Reliable	Satisfactory	Irregular	Unreliable
Initiative	Excellent	Good	Fair	Lacks initiative	Poor initiative
Judgment	Exceptionally good judgment	Good common sense	Ordinary	Lacks	Rash
Conduct	Exceptional	Gentlemanly	Well behaved	Too talkative or troublesome	or fresh Very poor

Days worked _____ Days absent _____

Department worked in _____

Type of work done _____

Additional remarks _____ Signed _____

_____ Dept. _____

This form is to be used in grading the Co-operative students of Georgia School of Technology on their co-operative work, and is used in connection with the University card record system of shop work.

It is requested that the space representing the degree or percentage of the character of the student be checked (X) within the block designating the percentage. The man who has the most intimate knowledge of the student's work should indicate the grade.

DEFINITIONS OF CHARACTERISTICS

INTEREST IN WORK refers to the spirit in which a student tackles a job.

APPLICATION is the willingness with which the student grasps new principles or seems at home on a new job.

SELF-RELIANCE is the useful confidence a student has in his own ability to do the work.

ACCURACY is the ability to turn out work which meets the set standard in all respects.

SPEED is judged by the rate of the student's production.

RELIABILITY is the employer's confidence that a student will do the thing expected of him.

INITIATIVE is the ability of a student to think and do for himself.

JUDGMENT is the ability to size up a situation and then pick the right course.

CONDUCT is the attitude taken by a student toward his superiors, his fellow workmen and other people with whom he comes in contact.

NOTE: After this has been made out, please forward to Prof. E.H.Flath, Co-operative Department, Georgia School of Technology, Atlanta, Ga.

Report Form Used by the Railroad for Co-operative Students

or pre-junior year, 34 in the second or sophomore year, and 28 in the first or freshman year. Of these 74 students two are employed in the signal department, 16 in the electrical department and 56 in the mechanical department. The principal shop facilities of the Central of Georgia are at Macon, Savannah and Columbus. Of the 74 students 44 are assigned to Macon, 20 to Savannah, 8 to Columbus and 2 to Cedartown. A boy from Macon, or living near that place, will of course be assigned to Macon for his shop work, thus allowing him to live at home or reasonably near it for approximately one-half of the time. The co-operative students, as employees of the railroad, are entitled to free transportation, thus making it inexpensive to go between the college, the shop and their homes. They are classed as regular railroad employees and therefore have all of the benefits of such employees, including group insurance and pension rights.

Three or four of the regular apprentices who showed promise and could meet the college entrance requirements have been transferred to the co-operative engineering course with credit for the practical experience which they previously had in the shop.

A few of the Central of Georgia co-operative students have been dropped, either because they could not finance themselves, even with the assistance of the wages paid them by the railroad, or because they decided that they did not care to follow up railroad work, or because they failed to come up to the standards required by the college. For the most part, however, the boys are enthusiastic about their railroad work. They also get along nicely with their associates in the shops and the foremen and supervisors. They are there for a serious purpose and take a real pride in their work and accomplishments. That they are interested in the railroad is indicated by the fact that reports of business voluntarily solicited by the employees quite frequently contain the names of some of these young men. A few of the co-operative students at the Macon shops also take advantage of the night school which is maintained at that place for apprentices and shop employees.

The college maintains the usual records for the co-operative students and sends copies of these reports to the railroad officers at intervals of six months. The railroad maintains an unusual form of record, which is reproduced in the illustration. It gages or checks the boys' character and ability and by comparing reports from several foremen in different departments over a five-year period, the young man's ability and his capability of holding a responsible position should be clearly evident.

To stimulate greater interest in the railroad work and also the school life, the Central of Georgia co-operative students have formed a club known as the Tech Right Way Club, named jointly for the college and the Central of Georgia employees' magazine. It holds semi-monthly meetings at the college and monthly meetings while the boys are at work, either at Macon, Savannah or Columbus. The first part of the day of these monthly meetings is usually devoted to an inspection of the facilities at the place where the meeting is held. Officers and foremen are invited to attend the meetings of the club and to address it.

The co-operative engineering course has the hearty endorsement of President Downs. This is shared by his associates and particularly by Superintendent of Motive Power, C. L. Dickert, in whose department most of the boys are enrolled. The work is directly supervised on the railroad by A. P. Wells, engineer of tests, and on the part of the college by Prof. E. H. Flath. As in the case of the railroad, it has the most enthusiastic support of the president of the college, Dr. M. L. Brittain. The Georgia School of Technology also has two co-operative civil engineering students on the Southern Railway, two mechanical engineering co-operative students on the Atlantic Coast Line at Waycross, Ga., and 12 mechanical engineering co-operative students on the Atlanta, Birmingham & Atlantic at Fitzgerald, Ga.

To Increase the Interest of business men in railroads Illinois Central employees are holding meetings with business men at different points on the system. They have also invited these men to inspect the yards and shops of the company. Business men at Waterloo, Iowa, Clinton, Ill., and Freeport, Ill., have already made trips to the shops at these points.

Requirements for Profitable Train Operation

Western Railway Club Listens to Two Addresses on This Subject Containing Many Practical Suggestions

ONE OF THE BEST attended and most successful meetings of the Western Railway Club this fall was held on Monday evening, November 17, at the Auditorium hotel, Chicago. The general subject discussed was the business of moving trains at a profit, the speakers being W. F. Thiehoff, general manager of the Chicago, Burlington & Quincy, Chicago, and E. B. Hall, superintendent of motive power of the Chicago & North Western, Chicago.

Many and perhaps most of the suggestions made are not new to railroad operating men but because of their fundamental importance they must always be kept in mind. Perhaps the most important single suggestion made by Mr. Thiehoff was that departmental lines be ignored in a co-operative effort to give adequate, economical service. Mr. Hall gave first place in his address to a plea for stabilized employment of mechanical forces in order to increase shop output and secure the high standard of equipment maintenance without which safe, economical train operation is impossible.

Owing to limitations of space the two papers cannot be presented in full. The more important suggestions in each paper, however, are abstracted in the following pages.

The Business of Moving Trains at a Profit

By W. F. Thiehoff
General Manager, Chicago, Burlington & Quincy, Chicago

The present day demand is for transportation service on reduced time schedules, minimum terminal movement, comfortable commodious equipment, convenient facilities, reasonable connections and courteous treatment, at minimum cost. These demands, coupled with ever increasing wages for employees, cost of material and equipment and fluctuation in volume of business offered require all of our energy, business acumen and experience in combined co-operative effort to "Move Trains at a Profit." The strictest economy and the maximum use of facilities and equipment are necessary.

In offering the following suggestions on this subject I am prompted to begin at the enginehouse because we cannot move trains without locomotives and the better the locomotives the better the performance, if used consistently and efficiently. As operating officers our duty is to co-ordinate the facilities at hand to secure their maximum use.

To do this we should assign, as far as operating requirements permit, the same class of engines to a division or district comprising several connecting divisions, giving heed of course to the class of engine that will produce the greatest efficiency—class and volume of business considered. This will enable the mechanical department to reduce to a minimum the repair parts to be carried in stock, give opportunity for hostlers, supply men, enginehouse employees, mechanics and foremen to become entirely familiar with the maintenance needs of the particular class, so that work can be done more expeditiously, efficiently and economically. This should apply to passenger, freight and yard locomotives as classes. A more uniform road performance may be had when enginemen and trainmen operate the same class of power, trip after trip, over the same territory, and yardmasters and yardmen, being familiar with a uniform capacity of locomotive, can plan their work better. If it were possible to assign power so that the tonnage handled into a yard from one division or sub-division could be taken out intact, it would make an ideal operating arrangement.

We can increase the available motive power by running engines longer distances, that is, run them over two or more divisions on through passenger and freight trains. We are beyond the experimental stage in this effort and some roads have been successful in increasing the number of locomotives available for a given service, by 15 to 25 per cent. The return on the invested capital is increased, and terminal locomotive handling facilities conserved. I am not sure that mechanical officers agree that the cost of maintenance has been reduced but it has surely made possible a reduction in the number of service employees at intermediate terminals. To make this possible locomotives must be equipped with modern appliances which mechanical officers are better qualified to suggest and recommend.

Our experience with larger locomotives equipped with stokers, modern grates and feed water heaters has been very satisfactory and has enabled us to increase materially the distance engines will run without having fires cleaned or being conditioned. Automatic stokers have increased the capacity so that an increased number of cars can be handled in heavy passenger service and more tons per train in freight service than could be handled with the same class of engine hand fired. We can also use an inferior grade of coal to advantage. The improvement in performance has been most pronounced in lignite coal territory as the capacity of the engine has heretofore been limited by the possible physical effort of the fireman to supply the firebox. We think also it saves flue maintenance, in that the engine can be fired without the heavy top draft that hand-fired engines are subjected to when the fireman opens the firebox door.

Anticipate Locomotive Requirements

The yardmaster and chief dispatcher can assist by anticipating their locomotive requirements and keeping the master mechanic and roundhouse foreman informed as far in advance as possible so they can plan their work accordingly. Many a delay can be saved and power better prepared if the mechanical men know just when an engine must be ready. I find them ever anxious to have an engine ready "on call" and they sometimes take a chance on a "short call," in their zeal to keep the trains moving, that might result in criticism for them if delays or failure resulted therefrom.

The assignment of yard engines presents a more difficult problem because of the complex requirements. Lead engines, however, should be of such capacity as to handle at least 50 per cent of a road train without drag effort, so groups can be maintained without excessive short switching, in cutting in or cutting out cars. Where considerable short switching is done, a smaller, smarter engine is desirable. I suggest these assignments for two reasons:

(1) To avoid damage to draft appliances on equipment, which will in itself save delay and mechanical expense.

(2) To expedite the movement of trains by having the class of power best suited to perform yard switch requirements.

The assignment of coal is another necessity. Few railroads have a uniform quality of coal and most of them have varying weather conditions—some engines have stokers and some are hand fired, so I suggest a study of the coal supply and the requirements. The location of coal and water plants to give such frequent supply as to avoid long runs is desirable and the location should be made where the grade is favorable in starting and stopping, if possible.

A good quality of water is perhaps a greater necessity than good coal, as a poor quality not only reduces the capacity of the locomotive en route but does such boiler and flue damage as will require expensive maintenance efforts. There is much need for practical chemistry, and a good water treating plant is a paying investment.

Consideration should be given to the time trains are ordered from terminals. The capacity of a line can be increased or reduced in such measure as good or poor judgment is used in starting trains from terminals.

Loss from Light Loading Never Regained

The cost of handling 100 net tons one mile is the unit we are judged by so I suggest that the chief dispatcher and the yardmaster confer frequently as to the most economical train load and then the yardmaster arrange to have every train in the prevailing direction of business loaded to that limit. If one locomotive moves in the prevailing direction with less than its economical capacity load, the loss cannot be recovered. Overloading another locomotive in an effort to "catch up" only magnifies the original error. Like human beings each engine should carry its share of the burden to avoid overworking the individual. The yardmaster should insist on having the train made up with loads ahead as far as possible and a division of loads and empties to provide average tonnage, in an average number of cars. It is essential to avoid excessive length of train where only empties are in one train and loads in another in the prevailing direction of traffic. Short loads in station order on the head end save road delay and cars grouped in a train for the same destination, junction or final terminal will save intermediate road and yard delays. Every switch saved in either the road or yard saves fuel and usually road overtime.

The dispatcher should start each train with the best planned meeting points he can from the terminal and check the destination report so he may be informed as to the number of cars and tons, whether short or through, peddler or expedite, and then keep a station or two *ahead* of the train with his orders. Every minute in excess of 12½ miles an hour is paid for at 1½ times the regular rate, and a few minutes delay often makes necessary a change in the whole line-up over the division. Keep posted on weather conditions. Insist on having local weather reports from road stations. We are just now entering a four months period of "ups and downs" and the weather man is sometimes a poor guesser. It is better to reduce the train load a little too soon than to drag into a bad weather condition and after struggling along against odds, run for fuel or water and finally tie up. Locomotives on sidings are trouble makers and expensive playthings. Likewise, during peak periods of business the loading of engines must be given careful thought to avoid cumulative delays to a number of trains because of slow-moving, heavy tonnage that would perhaps be economical during slack periods, but very expensive when the capacity of the railroad is taxed. This, of course, is all the more necessary on a single track line.

For the year 1923 the miles per car per day averaged 27.8. If the miles per car per day were increased only one mile on an average, based on 2,317,609 freight cars on Class I roads in the United States, it would increase the number of cars available 220,172.

Run as many through trains as possible, consistent with junction and branch line schedules for which connections must be provided in order to move important carload and package freight from distance terminals. Provide reasonable time deliveries, confining the short or peddler cars to way freight trains. This will help the dispatcher plan his handling, as delays for switching, setting out or picking up cars en route by so-called "through trains," is an unknown quantity when figured on in advance by dispatchers. Plan way freight schedules to cover as nearly eight hours' service as average service requirements and engine handling facilities will permit. Way work requires closer supervision than through trains because of its intermittent and irregular volume, and we must keep in mind that we pay a higher mileage and overtime rate for way freight, on the same miles per hour basis. The majority of way freight crews are on overtime before reaching their terminals, so their schedules must be figured on a time limit basis rather than the distance between their terminal points.

Make a study of l.c.l. consolidations to secure set-out cars at the larger way stations to reduce handling by trainmen. One or two station employees can handle a considerable volume of l.c.l. freight without overtime, whereas five and frequently six train and enginemen are delayed if the train crew unloads or loads any considerable volume of l.c.l. business.

Freight Service Inspectors Have Important Function

This reminds me of another saving that can and should be made. The freight service inspectors are the real scouts of our army. They, with the special agents, are the Good Samaritans who guard while we sleep, gather up the broken fragments, bind up the wounds of numerous packages, plead with agents, freighthouse employees, way freight train and enginemen to handle carefully and assist in preventing loss and damage. Their efforts are bearing fruit. They are better equipped to plan the consolidation of l.c.l. freight and work out the schedules with agents and conductors than any other employees, and they, with the claim agents, can do a wonderful work in suggesting to shippers the maximum use of equipment, prompt loading and unloading of cars, necessary coopering and best method of loading to avoid damage en route, etc.

Economy in Passenger Service

Are we operating more cars regularly in our passenger trains than will take care of the travelers, reasonably and comfortably? Think twice after you have had the check made because, "passengers per car mile" is a twin sister to the big brother "tons per train mile" and extra cars (or perhaps I'd better say excess cars) make the coal and water supply dwindle just as rapidly as hauling empty freight cars in the prevailing direction of business. Assuming we have the number of cars and class of engine to meet the requirements, let's start "on time." The agent and baggageman at the station will have trucks lined up and ready to handle the on and off baggage, mail and express with minimum delay; the dispatcher will have the orders ready if any are required; the operator will be out to deliver them; the brakeman and porter will assist the travelers on and off politely and pleasantly; and when the conductor says "all aboard," the engineman will be ready to move. If for any uncontrollable reason we are late, the dispatcher will (acting for the superintendent) inform the connecting division superintendent who will do his best to overcome the time lost and deliver us "on time."

In meeting bus competition, it may develop that responsible carrier lines should place in service highway motor vehicles in direct competition with those now operated and

seek to have this service regulated and policed by the same commissions, state and national, which now exercise their authority created by law in connection with public utilities and railroads. Such motor vehicles running in connection with train schedules would replace local passenger trains and reduce the way work of freight trains. Inasmuch as the railroads pay a considerable share of the cost of construction, why not use the facility?

Perhaps we should operate only a rail motor car, reliably equipped to serve more comfortably than the road bus and also handle mail, baggage and express, transferred directly to and from main line trains at junction points. Then we could perhaps operate with two or three employees instead of five, save fuel, water, roundhouse and terminal costs and get the passengers per car mile more nearly comparative with the train we left at the junction. But let's not forget to move on the schedule we advertise.

The Yard Master and Clerk Can Help

Let's look at the yard clerk's morning check. If there are loads 24 hours old—why? If the industry tracks are not set—why? If the rip track is being pulled at 9 a. m. or 3 p. m.—why? If the lead engine is on the spot—why? If 72 is due out and the road engine is standing on the outbound track, popping off and ready to go and the train not made up—why? If the delivery to connecting line was made at 1 a. m. instead of 11:30 p. m.—why? We can perhaps save per diem on 25 to 50 cars the next night by asking that question, and that would pay just as much as reducing an engine shift. In fact, every question we have asked is a money saver and there are so many more that can be asked that these few are only the foundation.

The opportunity for saving in yard costs is with us every day. Just as the dispatcher and chief dispatcher need reliable weather reports, so the yardmaster needs destination reports of trains in advance of their arrival and a close estimate on their arrival verified as to accuracy from time to time by the dispatcher. The yardmaster can then give a close figure in advance to the enginehouse foreman and dispatcher regarding time an outbound connecting train can be ready; also whether it is necessary to have a "fill out" switched ready to consolidate with through tonnage to arrive, in order to load properly the outbound train. Perhaps there are cars to ice, stock to load or unload, poultry cars to water, fruit or perishable freight to inspect. If so, the yardmaster must arrange for the necessary mechanical assistance, stock yard employees, maintenance department force or stores department employees to be on hand when the train arrives; have the yard clerk sort out the way bills and be ready to check out with the conductor when he comes on duty; direct stockmen to their outbound caboose or "drovers car"; and incidentally suggest to the yard foreman the necessary line up to handle the work with dispatch.

The yardmaster must anticipate the business requirements and arrange in advance his engine assignment to serve efficiently without having idle engine hours. Much depends on his organization and their willingness to serve loyally.

While at the yard office find out if a work train has been ordered for that date. What department are they serving? What class of work are they doing? Was the order for the train approved by the superintendent? I suggest that the roadmaster, master carpenter, engineer of maintenance or other officer who asks for a work train, plan carefully in advance to insure having a *full* day's work and ask for the crew to report for work at a time when yard or road interference will be at a minimum. He should keep in mind the necessity for having the equipment switched, roadway machines available and ready to serve, to avoid delay to the employees who are to handle the material or do the work. Likewise, have a sufficient number of men ready to secure the maximum use of work equipment, engine and crew. A delay to either is expensive and the use of a work train for less than a full day is almost inexcusable. Remember, we must pay a minimum day whether fully employed the entire eight hours, or only one hour. It is cheaper to pay some overtime to a train and engine crew than to leave a large maintenance force unemployed for an hour or more in order to release the train and engine crew in eight hours. So again we ask, did the superintendent approve the order for the work train?

We can further assist our mechanical friends by a careful inspection of equipment while in road movement by train and enginemen to protect against slid flat wheels, cut journals, damaged draft appliances, etc. It is more economical to treat hot boxes in time to avoid the damage or consequent set-out than to run them a few miles further and then burn coal to switch them out and have a mechanical employee make a pilgrimage to repair or recondition equipment. When equipment is delivered at the terminal in good repair by the mechanical department it is a reasonable requirement that we in turn deliver it back after road or yard handling without damage, if careful handling and frequent inspection will accomplish this result. We can also help by setting aside surplus locomotives and cars during periods of reduced business, preferably as they come from the shop or repair tracks. This is the same as a savings account in the bank to be drawn on in time of need and pays interest on the investment in the same ratio that it saves excess handling at roundhouses and yards. It requires a less number of mechanical employees to handle and maintain the number of locomotives actually required for service on a reasonable turn over, than twice the number to make the same mileage. Every car withdrawn from service and stored outside of frequently used yard tracks reduces yard engine hours. This also is the best time to make general repairs to equipment to secure the maximum use of owned equipment during peak periods of business.

The purchase of labor-saving machinery and tools is a good investment. A reliable motor car for the section, extra gang and bridge and building employees will save an average of 30 to 45 minutes a day for each man on an eight-hour shift and secure greater efficiency by conserving energy.

If roadmasters and master carpenters will assign their forces with due regard to the condition of track and bridges on the individual section or bridge gang limit, instead of providing an average number of men for each section, a saving will result without depreciation of maintenance standards and foremen can better plan a program for the season. Obviously, fewer men should maintain after new rail is laid with ties and ballast renewed, than on sections where the rail and ballast is worn, even though not enough to require replacement during the season.

Delay in Material Delivery Invites Carrying Surplus

Economy in the care and use of materials will help to keep the operating costs reasonable. If employees will use the same care in making requisitions for material that they do in ordering groceries, coal, wood, etc., for their personal use, or in making a check on the bank to be paid from their personal savings, the result will be most encouraging. Every requisition for material or supplies signed by the approving officer becomes a check on the savings account held in trust by the general storekeeper and purchasing agent. Then again, we should order at such a time as will enable the stores department to deliver when the force is available. We should use the material without undue delay and avoid having large quantities held that should be in the store stock. Remember this, a tool or some material held in your car house may necessitate the purchase of this same item to supply some emergency need elsewhere. Let us work on a close material margin, use good second-hand

material wherever possible, pick up and return all scrap and watch the storekeeper smile.

If we are to do this, the storekeeper must cash our checks with reasonable promptness. Delay in delivery of material, tools, or supplies is an invitation to the foreman to carry a surplus as a matter of self-protection. If we can only succeed in having the individual employee or officer, of whatever department or rank, understand his individual responsibilities and in the discharge of them help his neighbor where he can, we will preach less and practice more.

I suggest that we use the word "department" only when directing the inquiring public to assist them in conducting their business with dispatch. We should abolish departmental jealousies and criticisms, and, in a co-operative effort, share our duties, responsibilities, hardships and pleasures. Make the highest possible collective net earnings the aim of each individual. A favorable operating ratio should be cause for universal rejoicing.

The Mechanical Man's Part in Profitable Train Handling

By E. B. Hall
Superintendent of Motive Power, Chicago & North Western, Chicago

Maintenance of equipment is one of the big factors to be considered in moving trains at a profit. Service is all the railroad has to sell and the equipment should be so maintained that the management will be in position to furnish adequate service at all times.

Constant Employment of Mechanical Forces

The classification of work between the various shop crafts has been materially increased in the shops and enginehouses and, in order to get the greatest efficiency, the forces in such shops and enginehouses should not be disturbed. These forces should be stabilized just as far as practicable, as it is disorganizing either to increase or decrease forces. Regardless of the efforts made, or the system used, to obtain greater efficiency in shops and enginehouses or in fact in any industry dependent upon the efforts of a large number of individuals, the success of the system is in a great measure dependent upon the reward offered the individual. Surely constant and steady employment is not too great a reward for conscientious and efficient service. In other words steps taken to reduce payrolls in an effort to cut down expenses, while temporarily effecting an apparent saving, generally result in the eventual expenditure of sums greatly exceeding the amount saved. The fewer the changes that are made in mechanical forces and the more sure the men are of steady employment, the greater their efficiency, which results in increased shop output and a higher standard of maintenance of equipment.

Reductions in force could be eliminated to a great extent by establishing a yearly budget system for a minimum constant force. This would be one of the greatest factors in securing increased efficiency which in turn results in reduced unit costs. The budget should be on a money basis, with no restrictions as to classification or number of men employed, so long as the allowance is not materially over-run.

We all realize that in order to build up an organization in a shop or enginehouse on the basis of a money allowance, it is necessary to take into consideration the *average* loss due to men laying off, and there should be sufficient leeway in money authorized to overcome any possible fluctuation in pay roll occasioned by all men working more regularly in some particular month, instead of requiring the officer in charge to disorganize his shop by reducing forces to meet some small over-run.

Modern Tools and Machinery Essential

Too careful study cannot be given the matter of providing sufficient modern tools and machinery to take the place of those that have become antiquated and should be retired, or that may have become necessary on account of some change in class or amount of power being repaired at some particular point.

The results obtained from shops which are of necessity spread over a large territory are greatly dependent upon the enthusiasm and initiative of the foremen in charge of these shops, and it is hard to measure the effect on these foremen of having them make recommendations year after year for additional or replacement machine tools to handle some particular operation on which they, in their opinion, are losing money daily, and then have their recommendations carried along in the budget and apparently lost sight of entirely. These recommendations should be thoroughly analyzed and definite action taken promptly, the foreman being advised of the reason.

Granting the necessity of a yearly budget to cover such expenditures, this budget should not be confined to particular machines to be purchased, but rather should be set aside as a fund available for the purchase of any machine tools decided on by the proper mechanical officer after investigation and recommendation by his subordinates. He of course will be governed by their recommendations as to the expenditures which will make the greatest return on the investment. In this way it will be possible to meet promptly any condition that arises through the failure of a particular machine or the necessity for new or additional machinery. A large proportion of the loss which is the result of inefficient tools and machinery will thus be eliminated.

Quality of Material Often More Important Than Price

The purchasing officers can be of great assistance in the proper maintenance and operation of locomotives. They should be governed to a great extent by the recommendations of mechanical officers in the purchase of material and supplies and should not be influenced too greatly by a comparison in price. Too often an article is turned over to the motive power department for use on which a few cents may have been saved at the time same was purchased, but which costs the railway company many times the difference in labor on account of some inferiority not evident to the parties negotiating the purchase.

It is not the intention to belittle the efforts of the purchasing departments in attempting to effect as great economies as possible; we are all striving for the same end, but it is a mistake to substitute an article which may prove to be of inferior quality without proper consultation with the departmental officer placing the original requisition.

What I have said of material and supplies applies with equal force to fuel. No one can measure accurately the cost of lost efficiency due to poor or improper fuel, and likewise no one is in a better position to know when the fuel furnished is of an inferior quality than is the mechanical officer responsible for successful train movement. His recommendations should always have careful consideration.

One item often neglected or ignored entirely and which has a tremendous bearing on successful and economical movement of trains is the quality of water supplied for locomotive boilers. With the science of feed water treatment advanced as far as it is today, there is no reasonable

excuse for supplying water unsuitable for boiler use, and especially so when we realize that in many cases the saving in fuel and boiler maintenance for one year will be sufficient to equip an entire engine division with water suitable for boiler use.

Poor feed water is one of the main causes of engine failures due to leaky flues, cracked side sheets, and from 12 to 20 per cent of the loss of service of locomotives due to shopping for boiler repairs.

The locomotive terminal must be regarded as more than a mere shelter for turning locomotives at the end of the run. The necessity for better locomotive utilization compels improved terminal facilities in order that repairs may be taken care of promptly and efficiently and the locomotives made ready for service with the least possible delay.

The assignment of power to the various territories of the railroad must be handled judiciously with thorough knowledge of any unusual local conditions affecting the operation of such power. Good judgment must be used in the assignment of this power, both as to the type of power to best suit local conditions and the amount of power. Too much, as well as too little power at a terminal, is a source of loss and inefficiency. However, sufficient power should be available at all times to permit of daily and regular inspection and repairs to locomotives in service in order to avoid the cumulative bad effect of running neglected repairs.

In General Assigned Power Gives Best Results

There has been much discussion about long runs for locomotives; and nearly everything said so far has been favorable. There is no question but that a saving can be effected by running engines through terminals where facilities are inadequate to properly house the power, thereby making it a more expensive proposition to handle and maintain power at such points. But this saving is brought about principally through reduced forces and by fuel saved in firing up engines, which in most instances is more than offset by fuel wasted by dirty fires and the pooling of engines. A careful analysis of comparative records seems to indicate that the more nearly a railroad approaches regularly assigned power and the running of locomotives just as far as the crew runs and no further, the more efficient is locomotive performance and the less maintenance cost per engine mile. It should not be forgotten that the average miles per locomotive per year depend upon the number of locomotives owned and the amount of business handled. The only fair way to arrive at such mileage is to divide the total locomotive miles by the total number of locomotives owned. The method of operating power on the line has much to do with its maintenance. Locomotives should not be standing on side tracks at meeting points or stalling on ruling grades with excessive tonnage. This is not only a direct loss of locomotive utility but invariably results in further loss due to penalty overtime.

Each sub-division has a certain critical and economical tonnage limit, and it should be the first duty of the division officers to determine this limit and then so far as possible adhere to it. Tonnage trains must be started at a time when there is the least interference with passenger or other trains and should in all cases be started with the least possible terminal delay. In order to accomplish this, closest co-operation between yard and enginehouse forces and train dispatcher is essential. The dispatcher should at all times be in close touch with the enginehouse foreman, giving as much advance notice as possible of the power requirements after he has determined from the yard master the time that trains will be switched and ready for movement. By switching, I do not mean the mere assembling of cars on east and west bound tracks, but that all possible switching on each train should be done at the terminal, which includes the placing of all short cars in trains in station order in order to eliminate road delay.

Operate Trains on Time Schedules

All trains should be operated as far as possible on time schedules, especially on divisions where tonnage movement is equally distributed in each direction. If not so distributed, the tonnage trains should be operated on time schedule and the crews handling the lighter trains should be required to work their way against the heavier traffic. In other words place them on their own responsibility in making their meeting points and not rely on the train dispatcher.

This system not only gives the efficient crew an opportunity to show what they can do but proves to be an incentive for them to get over the road. It also relieves the train dispatcher of a great amount of detail, enabling him to check more closely the crews that fail to attain an average performance. The train master and road foreman in a few trips can then determine the responsibility, whether it is the train crew, engine crew or locomotive that is at fault, and the necessary remedy can be applied.

I have not mentioned the economies possible through fuel saved, as all railroad men now admit that fuel conservation and proper maintenance and operation of locomotives go hand in hand.

An ample supply of locomotives maintained in good condition with due attention to all possible economies, operated with the same attention to economical practices and limits, makes successful operation possible, and when this has been accomplished we have gone a long ways towards the movement of trains at a profit.

Cummins Hopes for Compromise on Legislation

WASHINGTON, D. C.

SENATOR CUMMINS has returned to Washington from Iowa, where he was active in the campaign against La Folletteism and Brookhart, with an optimistic idea that the results of the election may have created an atmosphere that will lend itself to a compromise of conflicting interests on railroad legislation and tend to eliminate the subject as a major political issue. To this end he proposes to hold a series of conferences with President Coolidge, Secretary Hoover, Senator La Follette and representatives of the railroads, labor organizations and shippers, to see if it is possible, by agreement and mutual consent, to put through a program of railroad legislation at the coming short session which he realizes it would be hopeless to attempt to fight through the present Congress. His position is that the election has demonstrated that La Follette cannot have his way but that as he is willing to accept certain ideas contained in La Follette's bill to amend the transportation and valuation acts, which he believes the railroads could also accept in the interest of a settlement, a fair opportunity for compromise is thus presented. If such an agreement cannot be reached he has no intention of trying to press the subject in the short session.

A settlement of the "railroad problem" which in the senator's opinion would take the railroads out of politics for a long time to come, in so far as that can be done under our system of regulation, centers, he says, on the subjects of consolidation, government intervention in labor disputes and the handling of the valuation question.

There no longer remains any dispute, he said, regarding the necessity of consolidating substantially all the railroads into comparatively few large systems, and he believes that many of the objections that are made to the idea could be overcome by the adoption of the consolidation bill which he introduced at the last session. The opposition of the rail-

roads, with some exceptions, he said, is confined largely to the restrictions imposed by any particular plan which the Interstate Commerce Commission might promulgate, and if they were encouraged to work out voluntary consolidations, subject to the approval of the commission but not necessarily in harmony with a pre-conceived plan, as the present law requires, much progress might be made. His bill would permit such consolidation for a period of years, besides giving more elasticity to the commission's final plan by providing for alternative plans and modification from time to time. Senator Cummins also believes that the opposition of cities which are now large railroad centers, but fear that their importance would be lessened by basing the proposed systems on a few larger cities, could also be overcome.

The Howell-Barkley bill, Senator Cummins said, probably represents the most difficult question on which to reach a compromise. Personally he favors a continuation of the Railroad Labor Board but he is willing to make concessions for the purpose of bringing about an agreement, on condition that provision is made for a "board of decision" representing the public interest, to make a finding in cases where the railroads and their employees cannot agree, although with no more power actually to enforce a decision than the present board has. He is not satisfied with the form in which an attempt to meet that idea was made when the bill was reported to the Senate on June 7, and he also believes that the machinery of adjustment provided for in the pending bill is expensive, cumbersome and complicated. The Senate committee amendment provides for the appointment by the President of a fact-finding commission, in important cases of dispute that threaten strikes, to make a public report. The senator insists that there should be a decision and he hopes that it may be possible to reach an agreement on this point, although railroad officers believe that the fundamental purpose of the labor organizations, which drafted the bill before it was sponsored by Senator Howell and Representative Barkley, was specifically to avoid any decision without their agreement.

As to valuation Senator Cummins believes that some of the ideas of the La Follette bill may form a basis for agreement. No one disputes, he said, that the railroads must earn a fair return on their value, and he thought that even the followers of La Follette and Brookhart would be satisfied if the amount of the valuation could once be definitely determined so that they could be authoritatively assured they were not being asked to pay rates based on an excessive amount. He would not agree for a moment to the provision in the La Follette bill whereby Congress would prescribe "prudent investment" as the basis of valuation, or to any other basis to be laid down by Congress, because under the Constitution the basis of valuation is a judicial question and any attempt by Congress to say what should or should not be included would merely waste time. He is inclined to favor, however, the La Follette idea that the railroads should be allowed only the actual interest cost on that part of their capitalization which is represented by bonded indebtedness but a fair return on the remainder of the value in excess of the bonded indebtedness. This plan contemplates, he said, that the interest on borrowed money should be treated as a part of the cost of operation and given the same recognition as operating expenses, and that the railroads should be allowed a profit only on their equity, the percentage of fair return to be somewhere between 5½ and 7 per cent, probably. Senator Cummins made it plain that he is indulging no vain hope that any fair basis of valuation will result in reductions in rates or that rates can be reduced in any way except by reductions in expenses, but said he thought the public would be willing to pay the rates necessary to produce a fair return once the valuation is actually determined.

Senator Cummins said he had approved of the principle of the Hoch-Smith rate resolution, which is pending in the Senate, but that he did not think it would materially change the practice of the commission or require it to build up a large additional force. He pointed out that it had already recognized the depressed condition in agriculture by reducing rates on agricultural products to a greater extent than other rates and that it is continually conducting investigations which result in widespread readjustments of rates.

There has been some talk that the radicals would attempt to punish Cummins at the next session, while they still have power to effect a majority by combining with the Democrats, by unseating him as the presiding officer of the Senate. It has also been assumed that when the Republicans are able to reorganize the Senate in the next Congress he would be re-elected to the chairmanship of the committee on interstate commerce, from which he was deposed last session by a combination of the La Follette forces and the Democrats. He has indicated, however, that if he could succeed in his plans for railroad legislation at this session, he would prefer the chairmanship of the judiciary committee at the next session.

The Increase in Efficiency

WASHINGTON, D. C.

THE FISCAL YEAR ending June 30, 1924, marks the first occasion since long before the war when our railway facilities have been completely equal to the demand of the country, says Secretary Hoover of the Department of Commerce in a review of business conditions during the year to accompany his annual report. "There were no car shortages of any consequence." He continues, "There was a speeding up of delivery of all goods. This complete reconstruction, expansion, and growing efficiency in transportation facilities marks a fine accomplishment on the part of our railway management. Its economic effect is most far-reaching. Every car shortage is a strangulation in the movement of commodities which reduces price levels to the producer and increases them to the consumer. It disarranges the sychronizing of our industrial fabric and widens the margin all along the line between producer and consumer. There is still requirement for extension of terminals and readjustment of rates. There are large consolidations needed for the ultimate best service and sound finance.

"The making of our transportation facilities adequate to our needs is one of the greatest contributions toward our economic stability. The following table shows the essential items of progress in transportation as compared with the two previous fiscal years:

RAILROAD OPERATIONS

	Year ended June 30			Per cent change, 1923
	1922	1923	1924	to 1924
Freight, ton mileage (millions)	251,536	431,035	436,737	+1.3
Average weekly car loadings	789,000	907,000	942,000	+3.8
Average daily car surplus	272,756	36,399	187,554	+415.2
Average daily car shortage	2,410	74,689	4,793	—93.6
Bad-order cars:				
Average for year	339,369	241,218	170,546	—29.3
Number at end of year	324,583	190,411	194,869	+2.3
Bad-order locomotives:				
Average for year	15,764	16,089	10,838	—32.6
Number at end of year	14,412	11,450	11,034	—3.6
Number of employees	1,643,000	1,770,000	1,850,000	+4.5
Total operating revenues (1,000 dollars)	5,508,169	6,104,274	6,120,646	+.3
Net operating income (1,000 dollars)	818,345	873,777	924,674	+5.8

	Calendar year		
	1921	1922	1923
Number of locomotives:			
Installed	1,330	1,379	4,037
Retired	1,130	1,682	3,746
In service end of year	54,949	64,512	64,896
Number of freight cars:			
Installed	63,406	77,221	197,875
Retired	69,245	126,472	*200,000
In service end of year	2,344,787	2,322,286	2,376,373

*Approximate.

NOTE—Certain of the above items relate only to Class I roads, which, however, include about 98 per cent of the total.

Missouri River Bridge at Blair, Neb., Rebuilt*

Old Structure in Excellent Condition After Forty Years' Service—Too Light for Modern Loads

By O. F. Dalstrom
Bridge Engineer, Chicago & North Western, Chicago

In 1923 the Chicago & North Western reconstructed its bridge over the Missouri river near Blair, Neb. This bridge was built in 1882-83. The superstructure, designed for the small engines and light cars of that day, was not strong enough for present day loads. The substructure, however, was of adequate strength. The four river piers were used in the reconstructed bridge without any remodeling to carry the new spans, while the piers and abutments of the approaches were remodeled to receive the new approach spans, which differed in type and detail from the old spans.

The old bridge provided originally for three 330-ft. through truss spans over the river channel, with approaches consisting of one 110-ft. deck truss span and one 22-ft. 6-in. deck plate girder span at each shore. The 110-ft. truss span in the west approach was replaced with a 176-ft. truss span after the bridge was completed. The total width of waterway provided for in the design was about 1,000 ft. The clear head room was 50 ft. above mean high water. The width of waterway necessary was determined by the width of the river at points some miles down stream from the proposed site, where the river, confined by banks on both sides, was somewhat less than 1,000 ft. wide, the waterway being clearly sufficient for the river at flood stage. The clear head room under the bridge was established by government engineers to provide adequate clearance for existing and for contemplated river traffic.

Bridge in Process of Reconstruction with Complete New Span at Left, Track Carried on Falsework in Center and Old Span at the Right

The Substructure Was in Good Condition

The substructure for the three 330-ft. river spans consists of four masonry piers on caissons sunk to rock. The piers under the shore ends of the 110-ft. approach spans were concrete-filled steel cylinders on pile foundations. The 22-ft. 6-in. girder spans at the extreme ends of the bridge extended shoreward from the cylinder piers, their shore ends resting on masonry abutments buried in the embankment. The purpose of the short girder spans was to fix the end of each embankment far enough back from the cylinder pier to bring the slope below the tops of the cylinders.

The stone for the piers was quarried at Mankato, Minn., and is an excellent grade of limestone, originally of a yellow color. The cutwaters of the upstream ends of Piers 4 and 5 were of blue granite, quarried at St. Cloud, Minn. The face stones were laid in Portland cement mortar. The backing was laid in Milwaukee cement mortar, except that laid during freezing weather when Portland cement was used throughout. The specifications for the masonry were very exacting as to quality of materials and workmanship.

When the reconstruction of the bridge was proposed, an inspection of the piers was made to determine whether their condition and probable length of life would justify erecting the proposed new superstructure on them. Every face stone in the four piers, above water level, was inspected. This inspection showed two kinds of weathering effects; some stones were pitted all over ¼-in. to ¾-in. deep and were rough to the touch, as if some soluble ingredient had been dissolved out. The other stones were wholly free from pitting, but many of them were spalling slightly. Fresh surfaces where spalls had dropped away recently and a few spalls still clinging to the stones, showed that the spalling was still going on. The loss by spalling or pitting, however, was so small that it was hardly appreciable except in one stone on the west side of Pier 3, near low water level, which had spalled off to a depth of nearly six inches over its entire face. This stone has since been faced with concrete.

The mortar in the joints was in excellent condition, no evidence of deterioration being found. The piers have never been pointed since they were built. Small dabs of mortar spilled on the lower courses during construction had hardened on the stones and could be dislodged only by a sharp blow with a hammer.

A number of cracked stones were found on this inspection. There were also a few cracks at joints. All except two cracks in the stones were vertical, generally near the middle of the stone and extended through only one stone. Two of the cracks were horizontal, one of them in a stone that showed signs of lamination. The largest cracks would barely admit the point of a knife blade, while the smallest were hardly more than visible. All of them appeared to be old cracks. The vertical cracks were probably caused by uneven bedding of the stones when laid, the stones cracking in vertical planes under the action of the superimposed load. The cracking permitted the stones to adjust themselves to the uneven bedding and no further developments followed. On the east side of Pier 6, near the north end, is a joint crack

*Abstract of a paper presented before the Western Society of Engineers, Chicago, on November 17.

running through five courses and through the connecting segments of the horizontal joints. There was no evidence of displacement of the stones, the crack being only about 1/16-in. wide. From the records of the inspection it was estimated that the piers were still good for not less than 50 years and probably much longer.

The piers under the shore ends of the 110-ft. approach spans consisted originally of two concrete-filled cylinders in each pier, built on pile foundations. The cylinders were 5 ft. in diameter, 12 ft. apart center to center, and connected by steel bracing from top to bottom. The shells were of 5/16 in. metal. The cylinders for the west pier were 42 ft. 9 in. long; for the east pier they were 13 ft. longer than those of the west pier, on account of the lower level of the ground line at the east pier.

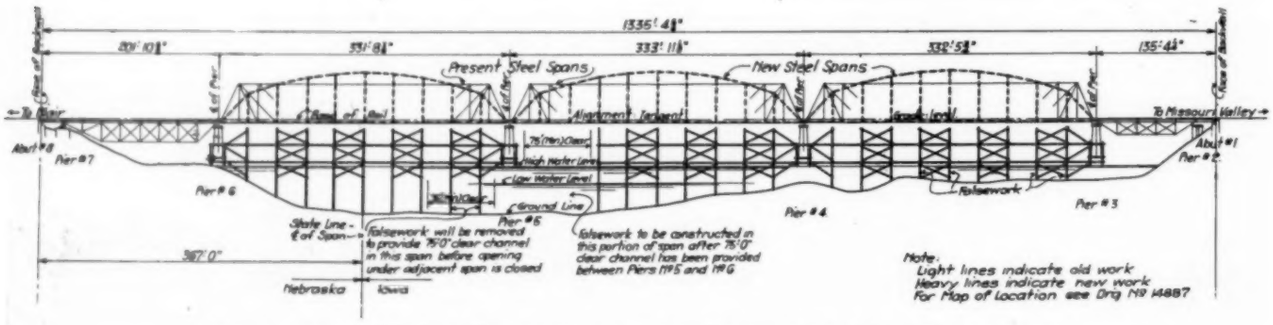
In 1900 it became necessary to remodel the two-cylinder pier in the east approach, making it a four-cylinder pier with bolsters on top, on account of a slow westward movement of the east embankment. No change in the superstructure was necessary. When the bridge was reconstructed in 1923, the pier was remodeled by cutting down the cylinders and lowering the bolsters.

On account of disturbances in the west embankment in 1884, it was decided that the end of that embankment should be kept farther away from Pier 6. Accordingly the 110-ft. span was taken out in 1885 and replaced with a new span to carry the girder span. To carry the end of the deck truss span while the pier was being cut down and remodeled, a special steel bent was built and set in place under the bearings.

Approaches Were on Unstable Foundations

The approaches at both ends of the bridge originally consisted of timber trestles on one per cent grades. The trestle at the west end was not contemplated in the original plan, which provided that this embankment should be finished to grade while the bridge was being built. When this embankment had been brought up to grade to within about 300 ft. of the west end of the bridge as established, a settlement of about 6 ft. occurred during the night of July 19, 1883. The ground at the sides of the embankment rose about 6 ft. at the same time. Borings revealed a layer of soft mud below the top layer of hard material, evidently marking the course of an old channel. The filling was continued until the embankment was again brought to grade; settling continued during the progress of filling, the ground at the sides rising about 14 ft. before equilibrium was established. It was estimated that the total settlement of the embankment was over 40 ft.

The embankment adjacent to the bridge was not carried up to grade at this time. The east end was leveled off at the full width of the finished embankment about 35 ft.



Elevation of the Old and New Spans and of the Falsework Used to Erect the Latter

176 ft. long, the shore end resting on a concrete and I-beam grillage, 12 ft.. by 24 ft. by 6 ft., buried in the embankment, which was sloped back to conform to the outline of the new span. The 22-ft. 6-in. girder span was re-erected at the end of the new span. The upper portion of the old cylinder pier was removed to a level slightly below the surface of the new slope.

In the reconstruction of the west approach in 1923 the 176-ft. deck truss span was replaced by two deck plate girder spans and a steel bent. The substructure for the steel bent consisted of two separate concrete pedestals built on concrete foundation piles about 40 ft. long. These pedestals were placed 23 ft. 6 in. apart to permit a pile driver to work from the track with leads suspended outside the bridge, the vertical clearance below the span being too small for a pile driver. This accounts for the width of the bent at its base, which is considerably more than required for stability.

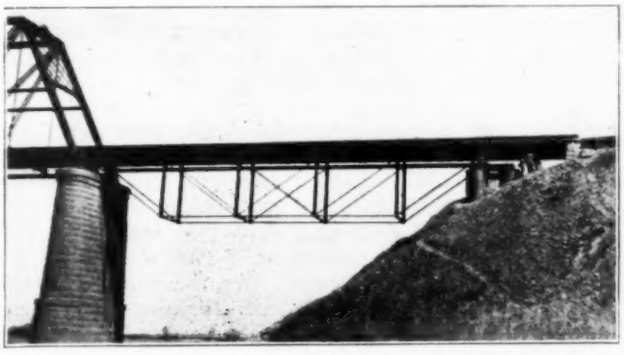
The old concrete and I-beam grillage at the end of the truss span and the old abutment were remodeled at the bridge seats to fit the new girder spans. The new approach spans were so designed as to require but little remodeling of the substructure.

In the reconstruction of the east approach the old 110-ft. deck truss span was replaced with a deck plate girder span of corresponding length. The old cylinder pier was cut down, the I-beam grillages replaced at the lower level and a transverse bolster built of I-beams set on the grillages below the level of track on the bridge, and a trestle about 220 ft. long was built to carry traffic until the embankment could be finished. The embankment was finished to grade up to the end of the bridge in 1884, but almost immediately after completion a section adjacent to the bridge settled about 10 ft., carrying the cylinder pier down with it. The span carried by the cylinder pier was held to grade during the settlement by blocking laid up as the settlement progressed. This settlement was near enough to Pier 6 to produce a slight movement, the top of the pier being displaced about 9 in. toward the river. It was not believed that the pier had been cracked or otherwise damaged, the displacement being accounted for by compression in the timber cribwork in the lower part of the pier. There has been no disturbance or unusual settlement of the embankment since 1884, and no further displacement of Pier 6 since that date. It was on account of these disturbances that the 110-ft. span was replaced in 1885 by the 176-ft. span previously mentioned.

The history of the east approach is quite different from that of the west approach. Since the material for filling had to come from the cut on the west side of the river, this embankment could not be constructed until after the bridge should be completed. Accordingly a timber trestle 3,000 ft. long was built to carry traffic temporarily. Filling was begun in the winter of 1883-84 at the end farthest from the bridge. In March, 1884, the highwater carried away 1,600 ft. of the trestle adjacent to the bridge, being all of

the trestle not protected by the filling. The trestle was rebuilt at once. Filling was continued during 1884, the portion not disturbed by the March high water being filled to grade and the filling well started under the rebuilt portion that year. The entire embankment was completed in 1885.

No settlement occurred during the filling of the east approach such as those that disturbed the west approach. However, a very slow westward movement of the cylinder piers following the completion of the embankment showed that the end of the embankment was moving toward the river. There was also a slight vertical settlement of the cylinders, as would be expected. The records do not show



Span at the East End of the Bridge, Showing Caisson Piers and Sliding Support

when this movement was first noticed, but it probably began before the embankment was actually completed. As the pier carried the fixed end of the deck truss span, this span was carried westward with the cylinders and embankment. When the movement had carried the deck span westward a few inches it became necessary to shift the pedestals on the cylinders eastward, drawing the span back to its original position to prevent it from crowding against the east river span. By 1900 the top of the cylinder pier had moved toward the river about 10½ in. and was still moving. The end bearing of the span had by this time been shifted toward the east side of the pier as far as it could go. The west end of the span was crowding against the end of the adjacent river span, making it necessary to repeat the shifting of the deck span. To remedy this condition and provide for future movement of the pier, a pair of cylinders, similar to those in the original pier but only 35 ft. long, were set 8 ft. 5 in. back of the old cylinders and filled with concrete. The old cylinders were cut down about 1 ft. and two I-beam grillages filled with concrete were set on top of the old and the new cylinders, parallel to the axis of the bridge, forming bolsters for carrying the truss bearings.

When the cylinder pier had been remodeled the deck span was moved back to its normal position. Also at this time the fixed and expansion bearings of the span were interchanged, the expansion bearing being transferred to the cylinder pier so that any further displacement of this pier would take place without displacement of the span. The slow movement of the pier continued after the new cylinders had been put in, all of the cylinders moving with the embankment. By 1920 they had moved so far that the base castings under the bearing rollers were almost in contact with the diagonal truss members. This was corrected in 1921 by sliding the base castings back a few inches and anchoring at a new place on the bolsters.

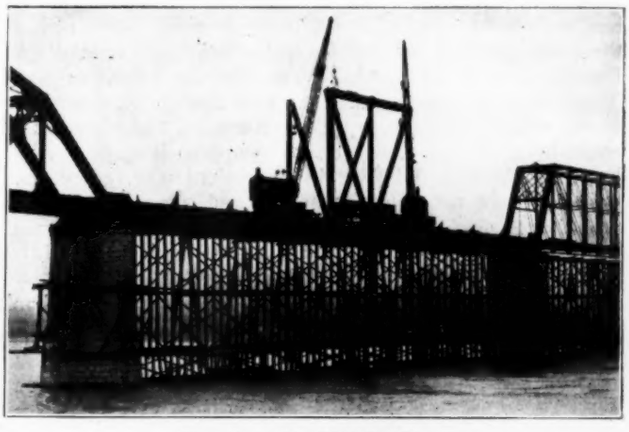
In 1921 a quantity of heavy stone from the abutments of an old bridge near Missouri Valley was put in along the foot of the slope where it projects into the river, the outer layer being stones of boulder size. These large stones, being massive enough to withstand the ice and the current at high-water, have protected the embankment against scour and no further displacement of the pier has been observed since this was done. The total displacement of the top of the old cylinders from their original position is 21 in.

Superstructure Showed Little Deterioration

The entire superstructure was in excellent condition when taken down. No reinforcing and very little repair work had been done on any of the spans during their forty years of service. In 1900 the short sections of eye bars in the adjustable counters in all three river spans were replaced with new pieces, on account of defects that developed in the original bars. In 1920 the connection angles in a number of stringers of the river spans were found to be cracked in the fillets and were replaced with new angles—12 pairs in all. In the same year several floor beams in the 110-ft. and 176-ft. approach spans were repaired where they had developed cracks in the webs near the bottom of the stringer connections, evidently due to the thrust from the ends of the bottom flanges of the stringers. In 1923 some cracked connection angles of stringers in the deck truss spans were on the order to be replaced, but the spans were taken out before it was necessary to do the work. The cause of these failures in the floor member details, at this late date, was probably the heavy cars which by 1920 were more severe on the floor members than the locomotives. There had been no increase in the weight of locomotives over the bridge for about 20 years.

There was no evidence of deterioration of the structure when taken down. There were no shoulders on the pins and no elongated pin holes. A number of the pins stuck fast in the top chords and the posts. Those in the chord that could not be loosened were burned off. Those in the posts were left there, the eye bars being simply slipped over the ends of the pins.

The history of this bridge is a good demonstration of the endurance of such a structure under favorable conditions of



Erecting the Middle Span

service and maintenance. It represented the best class of material and workmanship of its day. Traffic was always comparatively light, only a few trains a day each way. Situated at the summit of long, heavy approach grades, it was never subjected to the high speed of trains, which could scarcely attain the speed limit of 10 miles per hour allowed. Loading was always well within the capacity of the bridge until recent years when trains of heavy cars probably produced stresses in light truss members above the limits allowed in good practice. Rigid inspection was maintained by the general bridge inspector and the division inspectors. After forty years of service, there were no indications from which to determine the limit of life of the structure under existing

conditions. It looked good for 40 or 50 years more of the same kind of service, and gave no means of fixing the limit, since there was no measurable deterioration.

The three river spans were taken down in shape for re-erection. One of these has been assigned for re-erection over the Wind river near Riverton, Wyo., while the other two spans are stored at Blair. The deck spans were taken down as scrap, their size and shape making it impracticable to find a place to use them.

The New Superstructure

The new superstructure was designed for Cooper's Class E-60 loading. It was designed and built under the American Railway Engineering Association specifications for steel railway bridges, edition of 1923. The new spans were fitted to the four old river piers without any remodeling of the piers. In order to make the three river spans alike it was necessary to load Pier 6 eccentrically. The center line of truss bearings is 6 in. west of the center line of pier, and the center line of girder bearings is 2 ft. 11 in. west of the center line of pier. This eccentricity of loading was due to the displacement of Pier 6 toward the river as already indicated. As the pier was of ample strength for the new loading, and as the eccentricity of loading was in the direction opposite to the displacement of the pier, it was considered of too little importance to justify a special length of span to fit this pier.

The old deck truss spans of the approaches were replaced with deck plate girder spans and the substructure remodeled accordingly. The 176-ft. span of the west approach was replaced by two short girder spans and a steel bent, a more economical type than the single long span.

The new superstructure was designed by the American Bridge Company and fabricated at its Gary plant. The contract for the erection of the new superstructure was also awarded to the American Bridge Company. This contract, which was distinct from the contract for design and fabrication, included the construction and the removal of the falsework, the removal of the old superstructure and the erection of the new. The railway company furnished all the piles and lumber for the falsework, but none of the framing iron or the steel I-beams for the falsework deck. The contractor was required to take down the three river spans without damage to the members, so that these spans could be re-erected elsewhere. The approach spans were to be taken down and loaded in convenient way, except that stringers were not to be damaged, and were to be loaded separately in cars. These stringers were of a size and length making them good material to keep on hand for ordinary falsework.

A convenient storage yard was available on the west bank of the river just north of the bridge.

The Erection Proceeded Rapidly

The falsework for the three river spans, designed by the American Bridge Company, consisted of framed bents on piles. On the bents were set the I-beams, 24 in. by 115 lb. by 36 ft. which carried the traffic and the structures during the removal of the old and the erection of the new bridge. The piles furnished were Oregon fir, 70 ft. long, very large and straight. In approving the falsework plan, the railway company changed the longitudinal and transverse braces from nominal small sizes to 12-in. by 12-in. and 8-in. by 16-in., in order to secure good bridge timber from the salvage. This extra-heavy bracing rendered good service later when a sudden rise of the river threatened to destroy the falsework in the west channel spans.

No falsework was provided for the erection of the approach spans. The 176-ft. truss span in the west approach was shifted northward 19 ft. and landed on temporary pile piers, and the new spans and bent erected with cranes working from both levels. Traffic was suspended about ten hours while this change was being made. The old truss span in the east approach was cut up in place with Oxweld outfits and loaded direct into cars. The new deck girder span was erected by using two locomotive cranes, one at each end, to set the girders in place. Traffic was suspended 6½ hours for this operation.

There were only two periods of suspension of traffic in the entire program of erection. Some interruptions to train movement occurred when it was necessary to hold trains until the locomotive cranes could let go of the work in hand to move off the bridge and get in the clear.

The erection of steel in the west river span was begun October 13. From that date erecting and riveting were practically continuous until the last member of the east river span was erected on December 22. The 110 ft. and the 22 ft. 1 in. girder spans of the east approach were erected on December 19. The riveting of the truss members was completed on January 15, 1924. The erection of the brackets for planking and handrailing followed the other work and was completed on January 19.

The thoroughness with which the work of the contractors for fabrication and erection was planned and executed is demonstrated by the beginning of delivery of steel at the bridge site within five months after receiving the order; and by the completion of the entire program of erection, including the construction of the falsework and its removal, in a little more than six months.

Deck and Track

Ample provision is made for the protection of the deck and bridge against damage by derailments. The steel guard angles and 4-in. by 8-in. guard planks protect the ties against damage by ordinary derailments. The 10-in. by 12-in. guard rails, notched over the ends of the ties and bolted to every tie, hold the ties against bunching by derailed trucks, and prevent derailed cars from drifting into the trusses.

The free movement of the rails and expansion ends of spans, independent of each other, is provided for in five expansion joints in the rails, conforming in position to the expansion ends of the spans. An expansion joint in the rails at each end of the bridge protects it against damage from movement of the rails in the track beyond the ends of the bridge. The deck, track and railing were placed by railway company forces. The total weight of the spans aggregated 5,122,379 lb.

Passenger Traffic Officers and Families Returning on S. S. Berengaria from European Tour

State Commissioners Propose Changes in Law

Resolutions Passed at Phoenix Convention Favor Changes in Transportation Act

THAT THE STATE public service commissioners "view with alarm" the extreme centralization of railway regulation, under the terms of the Transportation Act, was evidenced in the course of almost every session of the convention of National Association of Railroad and Utility Commissioners, held at Phoenix, Arizona, on November 11 to 14, inclusive. This attitude was crystallized in a set of resolutions, substantially duplicating those adopted last year, petitioning Congress to undertake such amendments of the Transportation Act as would restore to the state regulatory bodies authority over the carriers substantially equivalent to that which they enjoyed previous to 1920. The discussion, however, disclosed a rather wide range of opinions, particularly with respect to the resolution urging revision of the rate making provisions of the Transportation Act, and was especially evident in the vote on the part of the resolution which denounces the group plan of rate making, since this clause was passed by the close vote of 23 to 22, with fully 15 per cent of those present not voting.

However, except for prevailing opinion on this one matter, the convention was characterized by a friendly attitude toward the Interstate Commerce Commission in carrying out the plan of co-operation provided for in Paragraph 3 of the Esch-Cummins Law. This was the key-note of the message of Commissioner J. B. Campbell of the Interstate Commerce Commission, in his address on Tuesday afternoon, and was touched on also by Harry G. Taylor, president of the Nebraska Commission, in his address at the opening session as president of the association.

Another interesting transaction was the amendment of the association's constitution to provide for a Committee on Public Relations. In the discussion preceding this action it was clear that such a committee was intended to function as the publicity organization for the commissions, to acquaint the public with facts concerning the purposes and powers of the regulatory authorities and the part they play in the affairs of the country. In pointing to the need of publicity work, attention was directed to the fact that high school text books on civics give little or no space to the subject of regulation of public utilities.

The program of the convention was diversified and fully occupied the time of the nine sessions in the four days. Federal valuation was the subject of an annual progress report again urging that the association continue its representation in valuation hearings through the employment of special counsel. The acceptance of the report was followed by the adoption of a resolution urging Congress to appropriate adequate funds to bring the valuation work to an early conclusion. The report of a special committee on consolidation was withdrawn by the committee with the suggestion that it be referred to another committee for further consideration during the coming year.

The various sessions of the convention were held in the senate chamber of the Arizona state capitol. The convention was attended by approximately 90 delegates representing the commissions of 35 states. Elaborate entertainment features carried out under the auspices of the Arizona Corporation Commission, in co-operation with the Chamber of Commerce of Phoenix, included automobile trips to scenic sections of Arizona and a trip by special train over the Southern Pacific of Mexico to Guayamas and Mazatlan during the week following the convention.

The affairs of the association for the past year and during the course of the convention were conducted under the direction of the following officers: President, Harry G. Taylor, Nebraska; first vice-president, William D. B. Ainey, Pennsylvania; second vice-president, A. G. Patterson, Alabama; secretary, James B. Walker, New York. At the election of officers held on Wednesday, Mr. Ainey was elected president and Mr. Patterson, first vice-president, while J. F. Shaughnessy, chairman of the Nevada Public Service Commission, was elected second vice-president. James B. Walker, L. G. Thompson and John E. Benton were re-elected secretary, assistant secretary and general solicitor, respectively. The next meeting will be held at Washington, D. C., for four days, November 10 to 13, 1925, inclusive.

President Sproule Welcomes Commissioners

The members of the association were welcomed at Phoenix by G. W. P. Hunt, Governor of Arizona, L. B. Whitney, Mayor of Phoenix, D. F. Johnson, chairman of the Arizona Corporation Commission, and William Sproule, president of the Southern Pacific. Mr. Sproule spoke in part as follows:

"In coming here you come to a territory somewhat remote from the central points of population, but after all remoteness is a mere question of condition. It is no exaggeration to say that to the average New Yorker, for instance, a trip to Pittsburgh is an adventure. We here travel thousands of miles to their hundreds and we take it as a matter of course. Distance with us counts very little. These great distances must be overcome in order that the destinies of the country may be worked out.

"No business can prosper unless it is on the basis of profit. That is true of the production of the soil, the orchard, or an investment in a railroad. The railroad and the producer work hand in hand. His product is worth little without the facility for transportation and transportation is worth nothing unless there are people who use it in quantity sufficient to justify it.

"I venture the view that the time has arrived when the misunderstandings of the business between the carriers and the public have so largely disappeared that it will become a matter of public conscience that the money devoted to the public should have its legitimate reward; for in other business it obtains its reward under judicious and capable management, and the money which is required for the continuous development of the railroads competes with money that is in the market for investment on the basis of profit to that money. That money in turn is not represented by the aggregations in banks somewhere in a corner of this country. It is in the aggregate the savings of the people of this country, whether directly or through the insurance companies and savings banks and other institutions, which find it advisable to adopt as a part of their investments those pertaining to the railroad. The company I represent has 63,000 stockholders, as an example, and the same is true of the other railroads.

"The railroads are managed with an eye to the public service and the theory of regulation has not only so widely prevailed but has been so generally accepted both by the railroads and the public that it is now well known that every activity of the railroads is within the public gaze—and everything that it does is subject to the scrutiny of the state and of federal commissions and of the governmental bodies generally. With that we have no fault to find. We simply ask now that in the growing light of day, in which

it can plainly be seen that the railroads are simply functioning to render the public service on a business basis, constructive measures shall prevail, with a recognition of the difficulty of getting money into any business unless upon the basis of profit to the holder of that money. It is upon that basis that all railroads have to progress."

President Taylor's Address

Harry G. Taylor, president of the association, outlined the more pertinent problems of the current relations of the state and federal commissions. His talk is presented below in brief:

"At our meeting in 1916 Chairman Meyer in delivering the address of welcome on behalf of the Interstate Commerce Commission, announced for the first time the views of that body with reference to effecting a legal status for co-operation between the state and federal commissions. It remained for an almost inadvertent and wholly suggestive provision in the Transportation Act of 1920 to demonstrate that when men really desire to get together, when they have 'the will for peace' they do not require mandatory enactments or the erection of imposing legal machinery. The almost gentle suggestion of co-operation embodied in the act, supplemented by a mild admonition by the Supreme Court in the Wisconsin case, furnished the impulse. It matters not which side took the initiative. I would be overly enthusiastic if I gave the impression that the effort at co-operation had not been attended by difficulties. The problem of railroad regulation is altogether too big and complicated to make any sort of procedure easy. But the great value in the experiment rests in the discovery that co-operation is a practical substitute for law and litigation.

"If we are to persist in the present endeavor to regulate our railroads to the point of super-management then it would seem that some diffusion of the regulatory power must be accomplished if we would avoid a breakdown. I have a positive conviction that 265,000 miles of railway serving 112,000,000 people cannot be successfully managed or regulated from Washington. It is not a question of legislative machinery or administrative procedure, nor even the most perfect sort of co-ordination of the various tribunals. The simple fact is that the government has attempted too much. A faint conception of the monumental task is gleaned from the statement that in 1923 the commission conducted 1,183 hearings and took approximately 248,383 pages of testimony. Opinions of the commission are today ground out on the production basis. It is not surprising, therefore, that many of them lack a full appreciation of local atmosphere, that they are inclined to distort local conditions so as to make them fit general requirements.

"The national character of our railroads cannot be ignored. I agree that it is entitled to paramount consideration in any scheme of regulation. Local self government in regulation, however, is equally essential. There should be a happy balance between the two. Establishment of broad policies of general application is the natural function of a national authority. Local interests, adverse to such policies, must of necessity give way. But railroad operation is a business of infinite detail. Action is rapid. Expedition is the ruling purpose. Judgments, in most cases, should be made by those on the ground. Authority should be kept close to the field of operation. In my opinion, the road to improvement does not lie in the direction of further experimentation with paternalistic theories.

"First of all, there should be eliminated from the law those provisions that interfere with essential managerial and executive functions. As an example, I refer to the power now possessed by the commission to extend or withhold approval of extensions, new lines or abandonment of existing lines. The status of railroad development today is such that the free play of natural economic forces can be trusted to prevent unwise or improvident construction. Likewise, the section relating to consolidation should either be eliminated or so modified as to permit volunteer mergers.

"The commission should be relieved of the impossible task of insuring 'honest, efficient and economical' management. These qualities of satisfactory service and successful operation are not the products of inquisition or mandatory orders. They come from the development of initiative and the stimulation of an *esprit de corps* in the organization. The development of this plan should relieve the Interstate Commerce Commission of a great mass of work and free it for a more intense and searching study of transportation problems."

Address by Commissioner Campbell

Commissioner Campbell took as the subject of his talk the opportunities of co-operation between the Interstate Commerce Commission and the state commissions. The following is an abstract of his address:

"No matter what critics may say of the Transportation Act of 1920 it must be conceded that the framers of that law had in view the building up and maintenance of a national transportation system, and in order that the facilities of that transportation system might be adequate it broadened very materially the supervisory powers of the Interstate Commerce Commission. Among the enactments of 1920 were paragraphs 3 and 4 of section 13 of the Interstate Commerce Act, which gave to the federal commission enlarged powers to look into and, in certain cases, control intrastate rates. The task placed upon the Interstate Commerce Commission is an herculean one, but Congress in its wisdom provided a means of co-operation between the federal commission and the state commissions which tends to lighten the burdens of the federal commission by casting some of them upon the shoulders of you, the state commissions.

"Congress recognized that a conflict between the state and interstate commissions could readily lead to confusion, misunderstandings, and bad feeling between the national government and the states. So it threw out the suggestion of co-operation, to which I have referred; and the Supreme Court of the United States, in the *Wisconsin case,* said:

" 'So, too, in practice when the state commission shall recognize their obligation to maintain a proportionate and equitable share of the income of the carriers from intrastate rates, conference between the Interstate Commerce Commission and the state commissions may dispense with the necessity for any rigid federal order as to the intrastate rates, and leave to the state commissions power to deal with them and increase or reduce them in their discretion.'

"Following the enactment of Paragraph 3 by Congress and the suggestion of the Supreme Court of the United States the Interstate Commerce Commission and a committee of state commissioners met in joint conference and adopted the report of the joint committee on co-operation, with which you are entirely familiar. In many cases the program outlined by the joint committee has been followed and to a very successful conclusion. It must of necessity be that in many cases state commissioners are in much closer touch with local conditions than the Interstate Commerce Commission could be, and are thus able to give to us the benefit of a judgment and experience obtained by close touch with conditions which brought about the controversy.

"The increasing number of joint hearings with state commissions necessitates a practice which will do away with formalities in connection with these cases and which will automatically obtain co-operation between the Interstate Commerce Commission and the state commissions participating in the joint hearings. When a joint hearing has been effected and subsequently the date for arguments fixed, the state commission participating in the joint hearing should consider the notice fixing the date of argument as an invita-

tion to participate with the Interstate Commerce Commission in the argument.

"Co-operation means concurrence as contrasted with antagonism and opposition. It means harmony as contrasted with discord. In the administration of Paragraph 3 of Section 13 it means the accomplishment of the greatest good for the country as a whole as contrasted with a particular portion of it. It means giving to the Interstate Commerce Commission the benefit of the counsel and views of able men, versed in transportation matters, thoroughly acquainted with local conditions and the immediate needs of the shipping public as well as the interested carriers."

Study Taxation of Motor Transport

The Committee on Motor Vehicle Transportation presented a detailed analysis of the present status of regulation and taxation in this field and outlined certain fundamental principles as affording the basis on which current inequalities in transportation may be overcome. A brief abstract of the report follows:

Motor vehicle transportation is in a class by itself in respect of the roadbed or way over which its vehicles operate. Boat operation is carried on over waterways for the most part provided by nature. Steam and electric railroads are required to purchase rights of way, construct roadbeds, lay ties and steel and maintain such structures at their own expense, and, in addition thereto, pay taxes thereon.

Motor vehicles engaged in the transportation of persons and property for hire operate over highways constructed by the public. It is no doubt true, as long as no compensation for the use of such highways is exacted of auto transportation companies, that they are indirectly subsidized at the expense of the public. It would be manifestly unjust, however, to exact fees from auto transportation companies subject to regulation without at the same time exacting similar fees from all vehicles making commercial use of the highways. Most of the states which have statutes regulating auto transportation apply them only to stages and trucks operating between fixed termini and over regular routes. To exact fees from vehicles so operating, other than to cover expense of regulation, and exempt trucks and for hire cars not operating between fixed termini and over a regular route would be both illogical and unfair. The committee believes that statutes covering the regulation of auto transportation companies operating between fixed termini and over a regular route should be so amended as to create and regulate a new class of auto transportation companies, embracing all vehicles not operating between fixed termini or over a regular route. In this way, practically all vehicles using the highways for commercial purposes could be brought under some form of regulation and could be required to make reports upon which equitable fees could be based.

It is impossible at this time to determine, from the standpoint of operation and experience, the most practicable and feasible method of taxing auto transportation companies. We shall, therefore, have to content ourselves with the announcement of a few fundamental principles, which we believe should be observed in the enactment of any fee statute.

First—A reasonable gasoline tax should be imposed, applicable to all vehicles using the highways.

Second—All taxes imposed upon motor vehicle common carriers should be imposed and collected by the state as a unit, to the exclusion of county or municipal units, with a possible exception of city taxes upon vehicles operating wholly within the city limits.

Third—If it is desired to impose equitable taxes for franchise rights, such a tax might properly be imposed upon vehicles operating between fixed termini and over a regular route under certificates of public convenience and necessity, to the exclusion of vehicles not so operating.

Fourth—Taxes or fees on motor vehicle common carriers, the proceeds of which are limited to the construction and maintenance of highways, should be imposed upon all stages, trucks and for hire cars, whether operating between fixed termini and over a regular route or otherwise, or whether operated for hire or by private industries in the transportation of their own commodities.

Fifth—In states where the imposition of fees and taxes would cripple or destroy small stage or truck operations rendering useful service in sparsely settled communities, any revenue tax imposed should apply only to revenues over and above a reasonable return to the motor vehicle carrier.

Urge Greater Interest in Valuation

The Committee on Valuation presented a statement showing present progress in federal valuation and urged that the association continue active in its review of this work "for the protection of public interest." Comments offered by the committee are reviewed below:

In the report of this committee to the 1922 convention, it was pointed out that the valuations made would soon become unusable, unless from time to time brought down to date, as provided in paragraphs (f) and (g) of the Valuation Act. At that time little had been done, but since then the commission has organized its forces for the accumulation of data necessary to the bringing of valuations to date. Present day valuations are necessary to enable the commission to function most successfully as a regulator of the carrier's rates and security issues, and of consolidation of railroads, and in cases involving the recapture of excess earnings, under the Transportation Act.

Before valuations can be brought down to date, however, they must first be completed, and it is evident that there is an immense amount of work to be done by the commission before such completion can be accomplished. There has been little public comprehension of the immensity of the task. The limiting factors in the final stage of completion of the first final values are the extent of the valuation's staff of attorneys and examiners. These must be increased, if valuation is to be completed within a reasonable time.

What the commission can accomplish will necessarily depend to a great extent upon the amount of funds provided for its use by Congress. For the year 1925 Congress has thus far appropriated only $647,260. Supplemental appropriations are hoped for, and the commission's valuation forces have not thus far been cut to the full extent that will be necessary if they are not made.

If the federal valuation work is to be completed it ought to be done promptly; and it would be not only wasteful from the point of view of cost, but a calamity from the point of view of efficiency to disband the trained forces of the commission wholly or in large part at this time. Rather such increases in appropriation should be made as to enable the commission to complete its valuation work within the next two or three years.

Accounting Committee Urges Allocation by States

The Committee on Statistics and Accounts reviewed the current status of the project for the revision of the classification of operating expenses and recorded its indorsement of the position taken by the *Railway Age* in regard to this movement as outlined in an editorial appearing in the issues of June 21, 1924, page 1753, and June 28, 1924, page 1803, namely that such efforts should proceed with extreme caution. The committee therefore urged that the association impress upon state commissions the necessity of giving careful and extended consideration to the tentative draft of the revised classification of operating expenses proposed by the Bureau of Accounts of the Interstate Commerce Commission. It advocated the holding of a conference of representatives of the state commissions so that the tentative draft of the classification of operating expenses of steam railroads may be comprehensively considered and presented to the Interstate Commerce Commission at the time the matter is heard for final consideration.

The committee also presented the specific suggestion that

the railroads be required to allocate by individual states all their returns covering operating expenses, traffic expenses, joint facility accounts and operating revenues. Similar recommendations were made with respect to statistics on traffic.

The committee called attention to the fact that the monthly report of the Bureau of Statistics of the Interstate Commerce Commission relative to the cost of handling freight and passenger train services for "selected expense accounts" is to be discontinued after the issue of December, 1924, and suggested that the question of dispensing with the above mentioned report by the commission should be given consideration and if possible the report be continued.

Consider Grade Crossing Problem

The report of the Committee on Grade Crossings and Trespassing on Railroads reviewed in some detail the work done by the association during the past year and presented the recommendations drawn by the grade crossing conference held in Chicago on April 30 and May 1. It also urged co-operation in the national conference on this vital subject to be held under the direction of Secretary Hoover of the Department of Commerce. An abstract of the committee's report follows:

Of 40 commissions from which reports were obtained 14 have specific jurisdiction through legislative act, to eliminate dangerous grade crossings. A Connecticut law requires the elimination of one crossing annually, for every 50 miles of road operated in the state. The Public Service Commission and the Transit Commission of New York have complete jurisdiction over all crossings, and receive appropriations from the legislature to defray the state's share of the cost. In Alabama, Maryland, Virginia, Utah, Florida, Texas, Idaho, West Virginia, Georgia, Kansas, Missouri, South Carolina, Wyoming and Illinois, the railroad commissions are in co-operation with the highway commissions, acting generally in advisory capacities, in settling disputes which arise between the highway commissions and the railroads when they cannot agree on the proposed elimination of crossings. The State of Kentucky vests authority over grade crossings in the various cities and counties. The commissions of Massachusetts, New Mexico, Arizona and Rhode Island have no jurisdiction over crossings, but work in harmony with highway commissions and railroads.

Most of the states having authority over crossings have adopted a policy which does not permit any new crossings at grade and provides for the re-location of highways so as to avoid crossings as much as possible. The efforts of the commissions in the actual elimination of crossings have resulted in the elimination of 350 crossings by the building of under-passes or overhead crossings, and approximately 350 crossings by re-location of highway during the past year.

Summarizing, the committee stated:

That the year 1924 finds an aroused public opinion as to the seriousness of the crossing problem.

That a well defined program having for its object the elimination of the crossing evil should result from the co-ordinated efforts of various organizations now studying the problem.

That the railroad and public utilities commissioners and state highway commissions have shown renewed activity in elimination of grade crossings.

That the press has been liberal in opening its editorial columns for a discussion of the subject, with beneficial results.

That the American Railway Association has done valuable service through its safety section.

Discussion

The discussion of this paper, which was made the occasion of a roundtable conference at a special evening meeting, disclosed a broadminded and reasonable point of view by all who gave voice to their opinion on the subject. There was general agreement that the elimination of *all* grade crossing was absurd. Attention was also directed to the perplexing problems presented in determining which crossings should be selected for elimination by grade separation. Dwight Lewis of the Iowa commission called attention to the question imposed in the case of the road crossing on a line of very light traffic. G. E. Halderman (Colorado) said the issues were often confused by records of accidents which frequently show that the "safest" crossing is the most dangerous. L. E. Gettle, chairman of the Wisconsin commission, pointed to the need of standards by which to measure the relative necessity for grade separation at different crossings, stating that, in his opinion, the absence of such standards may readily be causing the railroads to make expenditures on the demands of one state commission which might be made to better purpose elsewhere. He called attention also to the need of a well defined program of separation projects covering a period of years so that the railroads may be enabled to include them in their annual budgets at the proper time.

The regulation of the traffic on grade crossings was also discussed and while considerable progress was reported in the control of the operation of motor buses or other vehicles under the direct supervision of the commissions, no such encouraging testimony was offered with respect to the driving habits of the owners of cars in private use. Educational programs were advocated but no testimony was offered as to possible improvements to be expected from such measures.

Proposes Separate Division to Supervise Express Business

The Committee on Express Carriers reviewed the history of express rates and offered some specific recommendations which are abstracted below:

We believe that a standardization of express rates throughout the United States, except in local territory where special commodity rates are necessary to hold traffic, would work for the best interests of all concerned. The express companies must, in many districts, meet the competition of the U. S. Parcels Post, the service rendered by licensed automobile common carriers and that furnished by automobile vehicles operating without regulation. It is the thought of the committee that the express companies, wherever traffic can be developed at a profit, should be urged to establish satisfactory commodity rates, in territories where such adjustments are necessary, lower than those created by the zone and merchandise class rates.

Under the terms of the contract now existing between the American Railway Express and the rail carriers, the express company pays all of its expenses and takes from the remaining net amount 2½ per cent, leaving the balance as compensation to the rail carriers for the services they perform, guarantees to the express company 6 per cent upon its capital investment and divides the balance of the 2½ per cent with the rail carriers according to the terms of the contract.

It would seem to the committee that, if the rail carriers are not satisfied with the amounts they receive under the special contract for performing the services, they will endeavor at some future date to reopen the entire proceeding and to so revise the express charges as to give to the rail carriers greater compensation. It would, therefore, appear advisable and the committee recommends, that the state commissions give careful study to this phase of the express situation and be prepared at some future date, if necessary, to defend against possible actions on the part of the rail carriers. Much has been said in connection with the railroads conducting the express business themselves and entirely eliminating the express companies; this also is a subject worthy of your earnest consideration.

The express service is entirely different from freight or passenger railroad service. Its rates have all been prescribed for it, and its service reaches from door to door of consignor and consignee. It also conducts financial paper transactions, executes commissions of various kinds and in fact performs

so varied a service that one not familiar with the details has a hard time understanding a case when one arises. We, therefore, suggest that the Interstate Commerce Commission create a new department or division under the Division of Traffic or under the supervision of some particular commissioner and place in charge thereof an examiner to hear express cases and handle formally and informally questions arising involving express.

Resolutions

The following resolutions offered by the Committee on State and Federal Legislation were adopted by the convention:

1. We urge upon Congress such amendment of the Interstate Commerce Act as shall remove all question as to the continued power of state authorities to require common carriers to make additions and betterments to their plants and facilities reasonably necessary for the safe and proper service of the public.
2. We urge upon Congress immediate legislation which shall so amend the Interstate Commerce Act as clearly to define and limit the power of the Interstate Commerce Commission, so that no intrastate rate may be changed or set aside without proof by competent evidence, and upon findings of fact made, that the same injures a person or persons or a locality or localities engaged in interstate commerce to such an extent as seriously to diminish the business of such person or persons or seriously to retard the growth and development of such locality or localities, and that no intrastate rate may be changed or set aside by the Interstate Commerce Commission except on formal complaint by such person or persons in such locality or localities.
3. It is the sense of this association that the group plan of making rates prescribed by said Section 15a is uneconomic and unsound, and that the attempt, under its provisions, to produce returns upon roads that are unable to earn returns themselves, has placed an unjust burden upon the business of the nation, from which it should be relieved by the immediate repeal of said Section 15a.
4. That Congress be respectfully urged to amend the Interstate Commerce Act in such way that the regulatory authorities of the states may make reasonable orders and regulations, not in conflict with federal law, or with lawful orders of the Interstate Commerce Commission, requiring cars within the respective borders of such states to be equitably distributed to shippers desiring same, without regard to whether they are desired for use in shipments that are interstate or intrastate.
5. That Congress be, and hereby is, respectfully urged to make such amendments to the existing law as shall clearly exclude from the jurisdiction of the Interstate Commerce Commission the regulation of the rates and service of electric railroads, carrying on local street railway transportation.
6. That Congress be respectfully urged to amend the existing law in such manner and form as to restore to the several states all the rights, powers and authority enjoyed by each state relative to certificates of convenience and necessity prior to the enactment of the Transportation Act of 1920.
7. That this association endorses the Pittman bill, being Senate Bill 2964, to amend paragraphs (3) and (4) of the Interstate Commerce Act, for the safeguarding of state powers of regulation, and the promotion of co-operation between state and federal commissions.
8. That this association is opposed to the federal incorporation of railroads because such incorporation will be destructive of the proper regulatory powers of the states; and will render the states unable to tax railroad property, except to the extent, and in the manner, that Congress may see fit to permit.
9. That we urge upon Congress amendment to Paragraph 5, Section 20, of the Interstate Commerce Act of 1920, specifically to provide that the provisions thereof relating to depreciation accounting, and the rate of depreciation to be set up shall not apply to telephone properties within states, the major part of the revenues derived from which is from intrastate transactions.

Other Papers and Reports

The Committee on Car Service and Demurrage presented a brief report commending the work of the American Railway Association through its Car Service Division and as a result of the organization of the regional advisory boards in effecting a marked improvement in the distribution of cars and the elimination of complaints with respect to this phase of railway service.

The Committee on Public Ownership and Operation presented a remarkably convincing statement of the fallacies of government ownership taken primarily from the point of view of its effect in the field of public service outside of transportation. An address on Car Service and Demurrage, by Donald B. Conn, was published in the *Railway Age* of November 15.

The Committee on Railway Rates offered a voluminous report consisting in large measure of a criticism of practically all of the policies pursued by the railroads in the operation and development of their properties.

The subject of uniform laws on the regulation of public utilities was covered in an address by Carl D. Jackson, counsel, National Electric Light Association and the American Gas Association and in a report by Lewis E. Gettle, chairman of the Wisconsin commission. Mr. Jackson presented an outline of the work of the American Bar Association to this end, while Mr. Gettle presented his personal views based on experience in Wisconsin.

A report on railroad service touched on various points of contact between public and carrier, and the conduct of transportation, and outlined the views of the committee with respect to the authority of the state commissions on matters relating to stations, station service, etc., and pointed to the need of a clearer definition of the powers of the federal and state bodies in regard to such matters.

Another important feature of the program was the presentation of papers on various phases of the regulation of public utilities and the problems of the public service commissions by representative men in this field. These included addresses on various phases of telephone service by Eugene S. Wilson, vice-president, American Telephone and Telegraph Company, New York City, and Fred B. McKinnon, president of the United States Independent Telephone Association, Chicago; an address on regulation from the viewpoint of the public officer by Carleton McNally, corporation counsel, St. Paul, Minn.; the regulation of electric power service in its relation to finance by M. H. Aylesworth, managing director, National Electric Light Association. H. C. Abell, president of the American Gas Association, New York City, presented an address on the "Relation of Public Utilities to the Members of the National Association of Railroad Utility Commissioners," which comprised an outline of the principles of public service. The problems of the electric railways and their relations to the state public service commissions were outlined in papers presented by J. N. Shannahan, president of the American Electric Railway Association, and James P. Barnes, of the Louisville Railways, Louisville, Ky.

White Bus Operated Between Ashburnham and South Ashburnham, Mass., 2.6 Miles, by the Boston & Maine Railroad

Second Annual Conference of the Younger Men's Division of the Railroad Y. M. C. A.

Younger Railroad Men Hold Conference

Consider Opportunities in the Transportation Field and How to Make the Most of Their Lives

THE SECOND ANNUAL International Younger Men's Conference of the Railroad Y. M. C. A. was held at Detroit, Mich., November 14-17. There were 279 young men present accompanied by 66 adult leaders and representing 48 railway systems, 33 states and provinces and 58 different classifications of occupations. The general theme of the conference was "The Meaning of Service," and the purpose, in general, was to discover those factors which enter into real success in a man's life work, and particularly in relation to the transportation industry. The early part of the conference was presided over by Carroll W. McLeod, Canadian Pacific, Kenora, Ont., and the latter part by the newly elected chairman of the conference, W. Yarbrough, apprentice electrician of the Atlantic Coast Line, Waycross, Ga.

The proceedings were unique in many ways as compared to an ordinary meeting of railway representatives. The conference sessions were opened by periods of song service under the direction of George W. Campbell, of the Y. M. C. A. College at Chicago. Mr. Campbell is unusually gifted as a leader of mass singing and the way in which the boys participated was undoubtedly a large factor in making them feel at home and getting them into the spirit of the conference. As with other types of conferences, there were a number of addresses, but these were supplemented by group discussions, the young men being divided into 10 groups—from 25 to 30 in a group—under the direction of experienced adult leaders, who could inspire them to take part in a constructive way and encourage thinking along the right lines. In addition to this, individual personal conference with the adult leaders was encouraged whenever opportunity offered. That the young men have high ideals and are seeking to improve themselves was indicated not alone by the open forum discussions by the various groups, but more particularly by the personal counsel which was sought by the boys when the conference was not in session.

Keynote of the Conference

C. C. Robinson, secretary of the employed boys' work for the International Committee of the Y. M. C. A., sounded the keynote of the conference at the opening session on Friday afternoon, when he indicated the two great problems which confront the younger men in the railroad service—the future of the transportation industry in this country and the problem of youth. He emphasized the importance of character in meeting the larger problems and responsibilities which will devolve upon the men of the future in the transportation field.

Banquet for Delegates

One of the features of the conference was the banquet on Friday night, given by the Michigan Railroad Association, over which W. H. Flynn, superintendent of motive power of the Michigan Central, presided as toastmaster. Music was furnished by the Michigan Central Railway Orchestra.

Robert P. Stoddart, a special apprentice of the Santa Fe at Albuquerque, N. M., spoke on "What the St. Louis Conference Meant to Our Fellows." That the young men take these conferences seriously is indicated by a remarkable resumé which Mr. Stoddart gave of the high points of the St. Louis conference, his remarks being based upon notes which he took at the St. Louis meeting. He then described the Santa Fe apprentice convention which was held last March and was organized as a direct outgrowth of the St. Louis younger railroad men's conference. Local apprentice clubs had previously been organized on the Santa Fe. The meeting was held at Albuquerque, N. M., and extended over a period of three days. Addresses were made by local and system officers, business men of the community, and Y. M. C. A. workers. The larger part of the program, however, was devoted to open forum discussions by the boys.

Santa Fe Apprentice Clubs

Mr. Stoddart outlined some of the troubles which were met in organizing local apprentice clubs and suggested remedies. This conference arranged for a system athletic tournament and decided upon rules for the conduct of athletic contests. The next meeting of the organization, which is known as the Association of Santa Fe Apprentice Clubs, will be held at San Bernardino next spring. It has already proved a great inspiration to the local clubs in the development of more aggressive and constructive programs.

Second Annual Conference of the Younger Men's Division of the Railroad Y. M. C. A.

The Railway Employed Boys' Club

By Warren King
Great Northern, St. Paul, Minn.

One of the features of the conference was an address at the banquet on "The Railway Employed Boys' Club" by Warren King, a clerk in the office of the president of the Great Northern Railway at St. Paul, Minn. Mr. King's address follows:

The Glacier Park Juniors on the Great Northern was organized in September, 1919, with nine members. Today we have a total enrollment of seventy-seven. It encourages four-fold development of its members—devotional, physical, intellectual and social.

As is customary with fellows our age, we are slightly at a loss when it comes to the devotional factor of our development. We know what we are trying to accomplish, but we do not know exactly how we are going to do it. It must be remembered that in any character building organization it is nearly impossible to measure the accomplishment. It is very difficult for us to tell just how much good we do any fellow; how much influence we have over his character, or how much vocational guidance we give him which will influence his life. So when I relate the activities of our club tonight, without a doubt the greatest amount of good will go untold. In our club we encourage religion but we do not stress any particular phase of it because of the many creeds represented. The "Y" forms the virtual back-bone of any Employed Boys' Club, and although we as a railway club function practically alone, it is the influence and splendid organization of the "Y" that has helped us to accomplish what we have. The "Y," by conferences, vocational training, various athletic contests and summer camps, has kept the fellows so busy they don't have time for the things that are not worth-while.

So far as our activities relate to physical development, we have won two city kitten-ball championships and are a runner-up in basketball. By our active participation in athletics and through the publicity received we are being recognized more and more as a unit. The public, through reading about us in the papers, recognizes our activities as a club. Besides gaining the material rewards for our physical supremacy, we have come in contact with the ever-important principles of team work, co-operation and good sportsmanship.

We are blessed with a proper number of "sheiks" and "cake-eaters" who stimulate our social development. We have had a joint dinner dance with the Northern Pacific Club, several dances of our own, skating parties, etc. Without doubt, however, the greatest factor in our social development has been the regular weekly club meetings. These begin at 5:30 with a lunch served in our own cafeteria, followed by a short business meeting and a program in which we encourage talent from among the fellows. We have vocal and instrumental music, and various speakers. The social development helps keep our club life interesting and stimulates good fellowship.

The intellectual development program naturally includes part of our weekly club meeting program. We have various talks on vocational training, finding our life work, debates, papers by members of the club on thrift campaigns, etc. The officials of the various departments of the company explain to us how their particular department functions and dove-tails into the other departments to make that complex thing called a "railroad," which some politicians understand so little about. I can't help but tell you at this time how some of the talks of the officials have impressed me. One Great Northern official in the course of his very frank and helpful talk said, "Because I am no farther along in life is absolutely my own fault." The more I pondered over that statement the more highly I valued it. Here was a real man; a man who was not blaming anyone else for his status in society, nor complaining of his lack of opportunity, or of being held down by class distinction or lack of "pull," emphasizing the fact that the "push" as well as the "pull" must come from within each individual. Another Great Northern man who took up law at night school was asked why he sacrificed so much to enter a field that already seemed overcrowded. "You are right, it is crowded," he replied, "but there is plenty of room at the top."

We were told at St. Paul by C. C. Robinson, National Employed Boys' Secretary of the International Committee of the Y. M. C. A., that if he was not sure that many of the future business and professional leaders of the United States would come from the ranks of the employed boy, he would quit his work that very night. He stressed the fact of finding our life's work, work that we are naturally fitted for; the work which so interests us that it will not seem like work at all, and which, because of our natural adaptability, we will do better than anyone else. As James Russell Lowell said, "No man is born into the world whose work is not born with him."

What Makes It Go?

I have endeavored to show you that our club has developed a well rounded program of activities, and that if every member is willing to put forth the effort, he may obtain help in

the particular element in which he is lacking in order to maintain a full life. I have told you about the activities of the club, but not the underlying reasons or motives that prompted our accomplishments. It would seem to me like demonstrating how fast an automobile can go without giving the reason. I attribute our success to two reasons; first, the morale and attitude of the Great Northern officials toward us, and secondly, the attitude of the members themselves. We have in the Great Northern Railway as fine a group of officials as any corporation in the United States. I happen to be fortunate enough to come in contact with many of our officials, especially Mr. Ralph Budd, president of the Great Northern. I can sincerely say I do not know or ever expect to find a better type of man to work with than Mr. Budd. I say "work with" because I mean that. He makes you feel as if you were a partner; that no matter how small your particular duties may be, they must be done well for the success of the corporation. When you are working with him it is "Please do this" and "Thank you for that." Although he has plenty of snap to his requests, you know there is a ton of respect behind them. He does not demand co-operation, he does not plead for co-operation, but he earns it. He seems to possess that magnetic personality that just naturally pulls all the good right out of a fellow. What is true of him is more or less true of the rest of the officials. Mr. A. B. Moran, chief clerk to the comptroller, our club leader, who is here tonight, spends so much time with the fellows that I wonder when he finds time for his regular duties. Personally, I bother him with any question that comes to my mind. One day when I asked him if he were busy he said:

"I am never busy when I can help the fellows."

I don't want to live in a house by the side of the road
And be a friend of man,
But get out in the road by the side of a boy,
And help him whenever I can.

The splendid attitude towards the employees of the Great Northern as exemplified by Mr. Budd has done a great deal towards bridging the gap between employee and management, and stimulating that interest so essential to a successful corporation.

Boys' Club Started Something

The members of our club have become better acquainted, and have learned to act as a unit. We have learned self-assurance. We are beginning to realize that we contain an abundance of energy and potent possibilities that must be allowed to expand. We are, however, just an ordnary bunch of fellows. We have the normal amount of co-operation, but we have the same amount of jealousy, stubbornness, and lack of interest as any organization. From the nine original members who started the club, the Great Northern Railway now boasts a Men's Club of 375 members, a Women's Club of 365 members, a dramatic club, a choral society, a sextette and a glee club. Recently the Women's Club, desirous of learning of some of the evils of government ownership of railroads, invited Theodore Christianson, candidate for governor of Minnesota, to speak to them. They packed the hall 600 strong. North Dakota, Montana and Washington are now organizing clubs and I think it will be safe to say that if every railroad in the United States of America organized similar clubs, every employee would be bubbling over with enthusiasm for his work and loyalty to his company. They say all great things have a small beginning. The nine members of the Glacier Park Juniors realize their small beginning, but they are certainly proud of their present development.

In closing let me say that our neighbors, the Northern Pacific Railway, also has a fine group of fellows, and their club has also accomplished much.

The Spirit That Wins

By J. G. Walber
Vice-President, New York Central

The banquet closed with an address on "The Spirit That Wins," by John G. Walber, vice-president in charge of personnel of the New York Central. He was evidently greatly surprised at the high standard of the addresses made by the two young men who preceded him on the program and in opening his address remarked that "If the St. Louis conference did nothing more than inspire these addresses, it was well worth-while." An abstract of Mr. Walber's address follows:

I have no doubt that many of you feel that your future would be much more favorable if you had had the advantage of a higher education. Do not let that discourage you, but rather let it act as a spur to greater endeavor. In such endeavor you cannot escape building up character and capacity which will react upon every phase of your careers.

I would place as the first essential, the importance of realizing the necessity for being "all-around men." But that I mean, do not be one-sided or lop-sided. Every man is a triple being—physical, mental and spiritual. Each of these elements requires cultivation if a man is to develop. Although I have named the spiritual last, all of us who believe in the Bible, must recognize that it comes first—"Seek ye first the Kingdom of God and his righteousness and all else shall be added." This is no light command. No reasoning being will doubt the truth and soundness of that doctrine. Everyone of you has in your acquaintance living examples of its literal truth, and I have no doubt whatever that the explanation of the success of many a man is his faith in this command and living a life in conformity with it. There is in every man an urge to spiritual things with a natural tendency to grow; it is only when it is stifled through neglect or a conscious effort to ignore it, that it is stunted, but if it is given free play and is strengthened by practice it will develop characters which will stamp their impression upon every undertaking.

Let me illustrate how I see this element in man. I recently visited a flower show. As I looked at the marvelously developed chrysanthemums, I recalled the plants that we had in an old-fashioned garden many years ago. Those beautiful flowers developed from plants such as those which virtually grew wild. All the time those flowers were living in their simple, old-fashioned way they contained the elements which, when placed in favorable environments, coupled with intelligent cultivation, resulted in the gorgeous blooms we see today.

All of you are familiar with numerous similar examples of the development of flowers, roses and vegetables. They all prove to my mind that no different law controls their growth and development than governs us human beings. Just as there is contained in each of those plants the germs or elements which, when cultivated, result in their advancement to higher planes, so I believe there is in all of us a spiritual element which is constantly striving for higher things and which will grow and develop under the same laws that regulate the growth and development in the vegetable kingdom.

I therefore urge upon you young men, in developing "The Spirit to Win," to place first in the list of requirements the cultivation of the religious or spiritual sides of your natures. Live clean lives; cultivate your minds in the Scriptures. You cannot find in these enlightened days anything in literature that for completeness and comprehensiveness even approximates as a guide to social life, business life, and, if fact, your entire conduct, the Proverbs of King Solomon. If they had been written his year they would not be more up to date. They comprehend the entire range of

human interest and supply maxims for wisdom, truthfulness, loyalty, obedience, discipline and every other phase of human experience.

Can you find any better guide than—"The fear of the Lord is the beginning of knowledge, but fools despise wisdom and instruction." "Wisdom is better than rubies." "The wise heart will receive commandments, but the prating fool shall fall."

Then, on the actual wisdom of consideration for the other fellow—"The liberal soul shall be made fat; he that watereth shall be also watered himself." "By humility and fear of the Lord are riches and honor and life." "A man's pride shall bring him low, but honor shall uphold the humble in spirit."

The Romance of Railroading

A study of the Proverbs will also direct you to the second element necessary to a rounded out life, namely, industriousness. Under this heading loyalty and obedience play primary parts.

This is a gathering of railroad men. The railroad life is only paralleled by the romance of the sea. It is positively romantic, and as I see it, this urge is nothing more than a continuation of the fascination of childhood for watching the wheels go round and the curiosity of wanting to know what makes them go. We are only growing children. I doubt if there is any single industry which holds out the opportunities for advancement that the railroads do today. No single industry supplies so many diversified occupations: executive departments, financial, law, insurance, engineering, purchasing, mechanical (locomotive and car) and, to many, the most attractive of all, the transportation department. All the other departments exist for the futherance of that department. Each of these branches provides a field for display of initiative and resourcefulness, and each will reward conscientious effort.

There is no single road to success, but as I study the careers of successful railroad men I believe their success has been due to the ambition to do each job conscientiously and thoroughly, thus attracting attention to the exceptional manner in which they served. In this way they not only filled such positions exceptionally well, but accumulated capacities for greater responsibilities for which they were ready when the opportunities came. The same rule or law governs the development of capacities as controls the physical development. Both require exercise and no one else can supply that exercise for you. Study usefull literature. Stretch the mind by tackling difficult matter which requires application and concentration to comprehend.

Just as no one else can do your physical exercising for you, so also, you must do your own mental exercising. Be diligent. As Benjamin Franklin put it: "God helps those who help themselves." "The sleeping fox catches no poultry." "Lost time is never found again; what we call time enough, always proves little enough." "Employ thy time well if thou meanest to gain leisure, and since thou art not sure of a minute, throw not an hour away."

Surely in the railroad service there are hundreds, yes thousands of officials who have risen from the ranks, with no more advantages to begin with than you young men have. You come from many railroads. On every railroad you will find stalwart, upstanding, honorable men who succeeded on their merits, through diligence and honorable conduct. They did not go about advertising themselves but they "stuck to their knitting," worked hard and attracted attention to themselves because of the exceptional manner in which they filled each of the progressive steps of the ladder of success. I doubt if any of them worried very much about promotions. If they worried at all it was about filling the present positions.

Do not let any one deceive you with the claim that it is "pull" that counts. There are more "duds" and failures among those with a "pull" than among those who earn what they get through merit. They may succeed temporarily, but like the tree that is not planted in fertile soil, they soon wither and perish.

As the third phase of "The Spirit that Wins," I would name the necessity for caring for the physical body. A healthy employee is a valuable asset to any employer. Unquestionably the physical condition effects the mental. Do not neglect the body. The principal danger in this respect, however, is not the tendency to neglect physical exercise, but to practice it to the neglect of the other elements, so I would simply add as to exercise as in all alse, be temperate.

In closing I will simply remind you that "Order is the first law of Nature." Cultivate the practice of being orderly and systematic; maintain the right perspective of relative values; keep first things first; cultivate a well balanced life and I have no doubt that, perhaps unconsciously, you will acquire "The Spirit that Wins."

"Find Yourself" Program

Possibly the most constructive part of the program was that of the second day. C. C. Robinson forcefully developed the fact that according to figures of the vocational bureaus, probably as high as 75 per cent of the workers in industry are not engaged on work for which they are best fitted, and therefore cannot take the same interest in their work or use their talents to the best advantage. He emphasized the importance, not only from the boys' point of view, but also from that of the railroads and the community, of having all of the employees engaged upon that class of work for which they are best fitted. The railroads, more than any industry, require the services of a great variety of vocations and professions and there is little excuse for an ambitious young man not finding a place where his talents can be utilized to advantage.

A form was distributed to each boy, on which were listed the various positions on a railroad; he was asked to check those vocations in which he was particularly interested and to answer these three questions: "If you could choose now the occupation you would like to be engaged in ten years from today, what would it be? Have you had any experiences which lead you to feel that you have considerable ability for this kind of work? Have you any particular problem or question in mind now about your work, present or future?"

The conference was then divided into 10 sections for group discussions on these themes. Meanwhile the forms which had been filled in were carefully sorted out and the boys were divided into groups of seven, and each group was seated at the noon luncheon with a railroad officer or worker who was specifically fitted to counsel with the particular group of boys about their vocational problems.

An address was made at this luncheon by Roy V. Wright, managing editor of the *Railway Age* on "The Opportunity for Life Work in Transportation." He outlined the vital part which the railways played in the upbuilding of this country and in strengthening its economic, social and political unity. The continued prosperity of the country and its future development depend upon strong, prosperous railway systems. The great opportunities for ambitious and capable men, both in railroad service and in the allied industries, were then presented. Factors which will fit the young men for a larger position in the railroad organization were discussed, including knowledge of railway work, the ability to use this knowledge, and the development of ability to direct and lead men. The importance of well balanced manhood and the development of strong Christian character were emphasized.

Address By Charles E. Lindquist

Saturday afternoon was devoted to recreation and sightseeing and the session on Saturday evening was largely given

over to an address by Charles E. Lindquist, general secretary of the Brotherhood of Locomotive Engineers. He congratulated the boys on the advantages and opportunities offered to them by the Railroad Y. M. C. A. and told of the help and inspiration he had received from it. He discussed and emphasized the importance of the boys getting into that department or class of work for which they are best suited. He also indicated the necessity for developing and building up their characters on the right basis—on a rock, not sand—and then compared the man who was willing to drift and just get a living with the one who had aimed high and had secured victory after a hard fight. The games which a baseball team plays and wins in a hard fight after extra innings, give far more satisfaction than those which are easily won in a "walk-away." The day passes quickly when a man is interested in his work. It is easy to find trouble when we are looking for it, but there is much more satisfaction in persistently working and seeking for the good things.

Mr. Lindquist indicated, also, that the art of making good is in doing right. "Don't think about making good, but rather about doing right," he said, "and you will make good. You will find far more satisfaction in serving your employer to the best of your ability than in working for just what you can get out of it. Some of you will have to do more than the average to make up for those who cannot or will not come up to the average." Mr. Lindquist indicated also that one could not get very far with "pull" on a railroad, but that advancement and real progress depended upon doing the work so well and so efficiently that a man's superior will become convinced that he is fitted for greater responsibilities. He then challenged the boys by saying, "You know how much work you can do and how much you ought to do. Are you doing it?"

"Controversies," said Mr. Lindquist, "can be avoided by closer companionship between the workers and the employer. The employer should understand and appreciate the troubles and problems of his employees and the employees should recognize also the difficulties with which the boss has to contend. By mutual recognition of these problems, better understandings can be brought about, resulting in a larger degree of co-operation." Mr. Lindquist got his message home to the boys when he told how proud he felt when he was an engine wiper and an engineer would stop to speak to him. When he had advanced to a better position it was a great day for him when the superintendent recognized him, and still more so when the general manager showed appreciation for his work. Too great an emphasis cannot be laid upon the importance of such contacts in bringing about better relationships.

Mr. Lindquist closed his address by referring to the necessity for recognition of the Golden Rule in the railway organization. "The other fellow is entitled to the same consideration," he said, "but we should expect to give even more than we get. The employees should go to the employer clean handedly and only expect what is just and right, and in return give that which is fair and just."

The Spiritual Side

During the entire conference special emphasis was placed upon the four-fold development—that is, strong character and personal strength is based upon the full development of the mental, physical, social and spiritual factors. On Sunday special attention was given to the spiritual factor. The group discussion during the morning was largely concerned with questions which had been suggested by Mr. Lindquist on Saturday evening, after which the boys organized parties to go to the various churches.

At the Sunday afternoon session B. V. Edworthy, State Y. M. C. A. Boys' Secretary, of Kansas, made an address on "The Meaning of Service." He traced the meaning of the word "vocation" to its root—"God's call to you," and challenged the boys to live upright and Christian lives. This challenge, based on a simple presentation without any attempt to be dramatic or stir the emotions, met with a surprising response. Most of the young men signed cards on which they indicated the intention to strive toward higher ideals and to be of greater service to their fellows.

At the meeting on Sunday evening Cameron Beck, personnel director of the New York Stock Exchange, spoke to the group on "Building a Bigger Tomorrow."

At 7:30 o'clock on Monday morning the boys, as guests of the Michigan Central, left in a special train for Niagara Falls, arriving there at 11:30. General Superintendent J. L. McKee accompanied the train and acted as host on behalf of the railroad. Before taking the trip around the falls the young men visited the power plant of the Ontario Power Company of Niagara Falls. This was arranged for by H. C. A. Maisonville, publicity agent of the Pere Marquette, and through the courtesy of J. H. Jackson, superintendent of the power company. The boys returned to Detroit late that evening. A goodly number of the adult leaders accompanied the boys on this trip and much time, both going and coming, was devoted to personal conferences relating to the boys' vocations and other interests which concerned them.

Findings of the Conference

It was decided at the final session of the conference to recommend the holding of another annual conference next year and certain suggestions were made concerning this meeting, as will be noted from the findings, the more important of which follow:

"1. We recommend that a third International Y. M. C. A. Conference, Younger Men's Division, he held one year hence.

"2. We charge the delegates of this conference upon returning to their respective cities to report this conference to clubs of which they may be members and to other boys' clubs, to railroad officials, to railroad luncheon clubs, and to boards of directors of the Railroad Y. M. C. A.

"3. It is our opinion that the discussion or conference plan of dealing with questions gives us a proper attitude toward our work and helps us to discover the attitude that we ought to take toward our work. It gives us the chance to exchange ideas and helps us to a proper understanding of the purposes for which we have assembled, and therefore we commend the discussion plan on which this conference was conducted as contrasted with a program of platform addresses only, and recommend a larger use of the discussion or conference plan for next year's program. We especially recommend that a longer time be given to each of the several conference periods.

"4. In Planning the local arrangements for next year's conference we recommend that the adult group leaders and members of the group be kept together as far as possible, believing that it would add to the efficiency of the conference if both leaders and members of the group could be entertained in the same home or hotel.

"6. As we come to the final session of our conference we feel that too much was packed in too short a time, and we recommend that the program committee in planning next year's conference extend the conference a day, and that in planning the recreation they arrange an opportunity to visit one of the larger railroad shops. Finally, we recommend the adoption of an insignia or badge of the American Railway Employed Boys' Clubs of the Younger Men's Division of the Y. M. C. A."

Election of Officers

In addition to Chairman Yarbrough, the following officers were elected to serve during the next year: Vice-chairmen—John Cull, crew clerk, Reading Company, Philadelphia, Pa.; Bert Greene, file clerk, Northern Pacific, St. Paul, Minn.; Eugene Widman, Missouri Pacific, Dupo, Ill.; Laurence Brasher, apprentice, Atchison, Topeka & Santa Fe, San

Bernardino, Cal., and Lee Rogers, car clerk, Texas & Pacific, Big Springs, Tex. Secretaries—John Belknap, carman, Chicago & North Western, Boone, Iowa, and J. R. Terry, machinist, Boston & Albany, West Springfield, Mass.

The local arrangements for handling the conference were controlled by an executive committee including Frank H. Alfred, president and general manager of the Pere Marquette, chairman; J. P. Main, general manager, Shore Line; Henry Shearer, general manager, Michigan Central; H. E. Whittenberger, general manager, Grand Trunk; T. A. Roberts, general agent and superintendent, Pennsylvania, and E. F. Blomeyer, vice-president and general manager, Ann Arbor. A number of committees worked under the direction of the executive committee, including an entertainment committee, W. H. Edmondson, assistant to general manager, Grand Trunk, chairman; reception committee, J. R. Mann, superintendent transportation, Shore Line, chairman; banquet committee, G. E. Couse, assistant general agent, Pennsylvania, chairman; recreation committee, W. H. Flynn, superintendent motive power, Michigan Central, chairman; meeting place committee, Thomas J. O'Connor, general foreman, Wabash, chairman, and publicity committee, H. C. A. Maisonville, publicity agent, Pere Marquette.

The boys were keenly appreciative of the many courtesies which were extended to them. They were entertained in the homes of Detroit citizens during their stay in that city.

The National Industrial Traffic League

THE NATIONAL INDUSTRIAL TRAFFIC LEAGUE held its annual meeting at Hotel Commodore, New York city, on Wednesday and Thursday of this week with an attendance of about 500. Charles Rippin, of the Merchants' Exchange, St. Louis, Mo., president of the League, presided and J. H. Beek, executive secretary of the League, Chicago, was secretary of the meeting.

Secretary Beek, speaking for the executive committee, reported concerning efforts which had been made to promote the efficiency of the Interstate Commerce Commission by endorsing that body's request for a more adequate appropriation of money for the next fiscal year. The Commission has asked for about $7,300,000 but the director of the budget reduced this total to about $4,300,000, finally allowing, however, about $5,000,000. It is proposed to continue efforts with the congressional committee and a vote was passed instructing the president to appoint a committee to go to Washington and follow the matter up at the coming session of Congress. With the limited appropriation now contemplated the Commission's Examiners cannot be sent to localities where they are needed. Thus compelling citizens with business before the Commission to go to Washington. Lack of funds also works a defeat of justice by delaying the printing of reports of the Commission's decisions.

The first committee report was that on classification, A. H. Ferguson, chairman. The committee has held its regular quarterly meetings and also other meetings in Chicago. The meeting adopted its recommendation that approval be given to the proposed modification of Classification Rule 9 so that a consignor guaranteeing freight charges, under Section 7 of the bill of lading, shall be responsible only until goods are delivered to and accepted by the consignee. Acting on the committee's recommendation. The League voted to take no further action on a proposed revision of the definition of "tank car."

On the rule requiring that fibre boxes shall always bear marks describing their contents. There was a long discussion which, however, resulted in no decisive action as the Commission is to hold a further hearing on the subject next week (November 25). The meeting approved the proposal of the committee to try to get a rule that fibre boxes must bear description of contents "or an identifying symbol or number." Members reported however that carriers are careless about entering such numbers on way bills. Roads in Official Classification territory are favorable to the relaxation here proposed, but elsewhere the carriers thus far oppose a change. This committee has decided to take no further action on the proposal to ask the carriers' classification committees to publish all of their rulings.

The committee on Diversion and Reconsignment, H. D. Rhodehouse, chairman, recommended numerous changes in the carriers' rules on this subject. Proposed changes in Rules 7, 9, 11 and 14 were approved by the meeting. Rules 7 and 11 changed to make them consistent one with the other. Rule 9 made consistent with Rule 11A. Heading of Rule 9 clarified. On Rule 14 the committee proposes to ask the carriers to adopt for all carload freight, a mileage scale of charges (such as is now in effect for fruits and vegetables), which would be much lower than the local rates now charged for back-hauls. No new back-haul charges are to be introduced.

On Rule 16 there was a long discussion. The rule calls for a charge of $6.30 for a service which under Rule 11 is done for $2.70. To remedy this inconsistency the carriers' committee proposed that when indemnity bonds are surrendered in good season (within 24 hours) the lower rate should prevail, but not otherwise. However, further discussion ensued and a complete revision of Rule 16 has been proposed to the carriers. The meeting finally voted to ask the carriers to modify the rule so that it will insure freedom from the unreasonably high charge, adding that the League has no intention of using the desired change in Rule 16 as a ground for seeking any change in the time-limit set forth in Rule 11 beyond that embraced in the proposal now before the carriers' committee. This, however, was opposed by a strong minority, which evidently opposed making promises calculated to limit any future action of the League.

This discussion developed evidence of an inconsistency between the rule now in effect and the decision of the Interstate Commerce Commission on the subject, and the committee was instructed to seek the necessary correction. The practice of delivering order shipments before the arrival of the bill of lading has developed some abuses, and it was the sense of the meeting that the rule requiring the carrier to demand from the receiver a certificate that the bill of lading cannot be got, should not apply where delivery is made under a blanket bond.

The committee on Express and Parcel Post, H. M. Freer, Chairman, reported that the new express rates, finally affirmed by the Interstate Commerce Commission on October 13, last, would go into effect early in 1925. No further drastic changes are anticipated. Efforts to agree on a standard express receipt form have thus far proved unavailing; the American Railway Express is not yet ready to prescribe a single standard throughout the whole of its territory. Other matters dealt with in this report were left in the hands of the committee.

The bill-of-lading committee, W. R. Scott, Chairman, presented a long report on Canadian bills of lading for goods transported to points in the United States, on the decision of the Kansas Supreme Court in Browne versus Union Pacific; on the liability of commission merchants for freight undercharges, and on the liability of consignees for undercharges on prepaid bills of lading. This report was accepted without reading, after brief discussion.

The Demurrage and Storage Committee, T. N. Butler, chairman, reported a long list of proposed changes in the

Demurrage code which have been the subject of discussion with the Demurrage committee of the Transportation Division of the American Railway Association. The principal discussion was on Rules 2 B-1, 2 B-6 and 4 E.

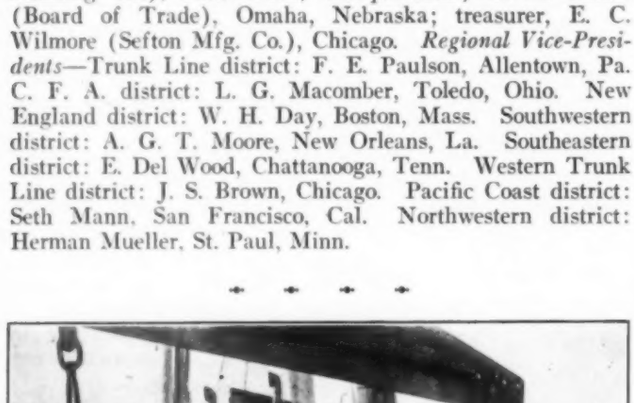
The definition of "unclaimed shipment" is variously understood and the requirement that the carrier's agent at destination shall give consignor prompt notice is subject to varied unterpretations. One member had in two years secured the refund of $10,000 in demurrage bills which had been collected by reason of unfair action under this notification requirement. "Shipment refused" is another term the definition of which was not clear to some of the speakers. Telegrams sent by railroads "collect" to notify consignors that their shipments had not been delivered also became the subject of numerous questions. It was voted to ask the American Railway Association to formulate an authoritative definition of "unclaimed" and to provide for the discontinuance of "collect" messages to consignor. The remainder of this committee's recommendations were put over until the second day, report of which must be deferred to a future issue.

At a dinner at the Hotel Commodore on Wednesday evening Sir Henry W. Thornton, president of the Canadian National, addressed the league. Sir Henry advised those present to do all in their power to prevent political interference with the railways and to give "the railway executives an opportunity to demonstrate what they can do."

"I want," he said, "to register my opinion that no country has a more honest, capable, patriotic lot of men than those who are charged with the responsibility of administering the railway systems of the United States."

Officers Elected

The election of officers for the ensuing year resulted as follows: for president, Paul M. Ripley (American Sugar Refining Co.), New York; vice-president, C. E. Childs (Board of Trade), Omaha, Nebraska; treasurer, E. C. Wilmore (Sefton Mfg. Co.), Chicago. *Regional Vice-Presidents*—Trunk Line district: F. E. Paulson, Allentown, Pa. C. F. A. district: L. G. Macomber, Toledo, Ohio. New England district: W. H. Day, Boston, Mass. Southwestern district: A. G. T. Moore, New Orleans, La. Southeastern district: E. Del Wood, Chattanooga, Tenn. Western Trunk Line district: J. S. Brown, Chicago. Pacific Coast district: Seth Mann, San Francisco, Cal. Northwestern district: Herman Mueller, St. Paul, Minn.



First Locomotive of a Shipment of 20 for East India Railway Landed in Calcutta—All Were Shipped in Running Order from Plant of Sir W. G. Armstrong-Whitworth Co., Ltd., Newcastle-upon-Tyne

Freight Car Loading

WASHINGTON, D. C.

ELECTION DAY and the usual seasonal decline brought about a reduction in car loading during the week ended November 8, to a total of 994,504 cars, a decrease of 41,717 cars as compared with the corresponding week of last year but an increase of 50,318 cars as compared with 1922. There were increases as compared with last year, however, in the loading of grain and grain products merchandise and miscellaneous and in the Pocahontas, Southern and Southwestern districts. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING

Week Ended Saturday, November 8, 1924

Districts	1924	1923	1922
Eastern	231,549	241,800	232,381
Allegheny	195,711	203,585	203,315
Pocahontas	45,713	40,908	30,144
Southern	150,731	144,847	138,050
Northwestern	133,995	163,482	138,050
Central Western	158,498	167,642	147,081
Southwestern	78,307	73,957	60,062
Total Western	370,800	405,081	340,296
Commodities			
Grain and grain products	54,769	49,015	52,323
Livestock	37,053	43,014	37,889
Coal	171,985	190,587	184,610
Coke	9,593	11,334	12,269
Forest products	67,227	75,181	60,597
Ore	23,936	52,812	39,428
Mdse., l. c. l.	252,686	250,219	227,401
Miscellaneous	377,255	364,059	329,669
Total	994,504	1,036,221	944,186
November 1	1,073,430	1,035,849	979,851
October 25	1,112,345	1,073,841	999,718
October 18	1,102,336	1,073,095	989,889
October 11	1,088,462	1,085,938	969,487
Cumulative total, January 1 to date	42,151,097	43,687,959	37,144,181

The freight car surplus during the first week of November showed an increase to 116,448 cars, including 36,734 box cars and 60,097 coal cars. The Canadian surplus was 3,500, including 1,200 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended November 8 showed a decline from the previous week of 5,164 cars, of which 4,078 were in the Eastern division and 1,086 cars in the Western division. The largest decline in the East was in miscellaneous freight of 1,651 cars, while grain, live stock, lumber and merchandise all showed considerable decreases. In the Western division grain loadings fell off 1,771 cars, but live stock increased 605 cars and coal 767 cars. Compared with the same week last year there was little change.

TOTAL FOR CANADA

Commodity	For the week ended Nov. 8 1924	Nov. 1 1924	Nov. 10 1923
Grain and grain products	17,429	20,009	20,038
Live stock	3,768	3,483	2,982
Coal	8,678	7,839	8,203
Coke	257	291	368
Lumber	3,390	3,859	3,783
Pulpwood	1,230	1,233	1,425
Pulp and paper	1,927	2,114	2,102
Other forest products	2,323	2,574	2,145
Ore	1,141	1,173	1,053
Merchandise, l. c. l.	15,433	16,019	14,559
Miscellaneous	13,900	16,046	13,384
Total cars loaded	69,476	74,640	70,042
Total cars received from connections	30,304	32,734	32,106
Cumulative totals to date—1924	.....	.....	2,508,339
Cumulative totals to date—1923	.....	.....	2,435,533

IN MICHIGAN, motor vehicles that are common carriers of passengers are required to come to a full stop before proceeding over any railroad grade crossing. This is the essence of a rule issued by the Public Utilities Commission of the state, under the law of 1923, Act No. 209, Section 2. The rule is a part of an order, filling several pages, regulating common-carrier traffic by automobiles generally both passenger and freight.

Low Temperatures in Refrigerator Cars*

Why Fruits, Vegetables and Eggs Should Move at Less Than 50 Deg. F.—Light Salting of Ice Important

By Dr. M. E. Pennington

PEOPLE OF ALL CLASSES in the United States are demanding fresh fruits and vegetables and seasonal meats throughout the year. Cold storage to preserve certain perishables through the season of non-production and refrigerated cars to transport others from the sunny South to the non-producing North have made it possible to obtain practically all of the common foods and many of the unusual ones at any season. The market offerings, in the cities at least, vary but little, be it June or January. The refrigerator car is probably the most important single factor in this great development.

It is but little more than a half century ago since ice and dressed meat, loaded into a box car with sawdust packed betweent its double walls, laid the foundation for the present enormous traffic in perishables and the great fleet of refrigerator cars which makes this traffic possible. From such a crude beginning the car has passed through a long evolution until at the present time nearly all of the railroads owning refrigerator equipment and the companies organized primarily to supply and lease cars to haul this class of freight have adopted the essential features of what has been termed the "United States Standard" refrigerator car. These essentials are "basket bunker", insulated "bulkheads", a slatted rack four inches in the clear above the car floor and insulation equivalent to at least two inches of pure cork board over the body and floor of the car and the equipment of two and one-half to three inches in the roof. Such a car, for the purposes of this paper, will be referred to as a "standard refrigerator." Combining these essentials with the fundamentals of car building to obtain the maximum of mechanical efficiency consistent with cost limitations is a problem always before the engineers and is constantly discussed in railway literature from the engineering and building viewpoint. The maintenance of the temperatures necessary to preserve the various commodities hauled, which is the basic reason for the existence of the car itself, is but rarely touched upon in the literature and often but dimly comprehended by the men responsible for refrigerator car construction. It may be well, therefore, to discuss some of the findings of the pomologist, plant pathologist, bacteriologist and bio-chemist who have been, and are, investigating the relation of fruit and vegetable rots, diseases and fungus infections to the temperatures maintained in transit; and of low bacterial counts and the retardation of chemical decomposition as determined in animal and fish products when well handled at adequately low temperatures.

Temperatures Being Steadily Lowered

As facts on the application of refrigeration to the preservation of perishables have been acquired, the temperatures viewed as desirable have gone steadily lower. Emphasis has also been laid on a quick removal of orchard or animal heat. Fresh killed poultry, ten years ago, was held in a cool place for several hours before it reached the chill room, kept at a temperature of 32 deg. to 35 deg. F. Now it is whisked from picker to chill room, preferably by a mechanical carrier which delivers it almost as soon as life is extinct. Many carloads of apples in the autumn formerly moved to storage in box cars. Now refrigerator equipment is considered imperative and recent investigations† emphasize the need of temperatures as near 32 deg. F. as possible from tree to storage room if the full life period of the apple is to be assured.

Prior to the almost universal adoption by the carriers of the United States of the standard refrigerator car and their program for substituting as rapidly as possible, cars of this type to take the place of the variously constructed and too frequently extremely inefficient equipment formerly depended upon, the temperatures on the top layer of the lading in summer were ordinarily from 50 deg. to 55 deg. F., or higher. On the floor of the car at the bunker opening temperatures frequently dropped to 35 deg. F. As a result, such commodities as cantaloupes and peaches had to be picked so green that their fine flavor never developed, though frequently they decayed in transit. The length of the haul of strawberries, cherries and such small fruits was limited by the rate of softening or decay, especially in the top layer of packages.

Over-Ripe Cantaloupes

In the study of cantaloupes in transit, McKay‡ found that when the temperature of the melons in the top layer did not fall to 50 deg. F. until the sixth day of the haul, then averaged about 47 deg. F. until the eleventh day, 86 per cent of the top layer was soft from the marketing standpoint at destination. When the temperature of the melons fell to 50 deg. F. on the fourth day and after the sixth day averaged about 43 deg. F., only 14.3 per cent were soft; while a temperature of 45 deg. F. on the second day, and from 39 deg. to 42 deg. F. during the balance of the eleven day haul resulted in 9.8 per cent soft fruit. This investigation has been abundantly confirmed by the improvement in the condition of cantaloupes now on the market hauled largely in cars of the standard type. Apparently 50 deg. F. is not a low enough temperature to prevent over-ripening of cantaloupes. Apparently, also, the fatal line is not far above 45 deg. F. while temperatures close to 40 deg. F. reduce the number of soft melons to relatively small numbers.

Control of Common Peach Rots

In peaches and other stone fruits, such as prunes and cherries, heavy market losses are due to two fungi which cause brown rot (Sclerotinia cinerea—Bon. Wor.) and black mold rot (Rhizopus nigricaus Ehr.). Brooks and Cooley** have studied the rate at which these rots develop at 50 deg., 45.5 deg., 41 deg. and 36.5 deg. F. They report that, on peaches, 50 deg. F. holds brown rot in check from one or two days; 45.5 deg. F. for three days; 41 deg. F. for four days, and 36.5 deg. F. has prevented development of this rot for six days. With the black mold rot on peaches, it was found that 50 deg. F. gave control for three days; 45.5 deg. was efficient for six days or more. Also, prompt refrigeration after picking the peaches, results in increased resistance to the inroads of these fungi. Cooling immediately to 50 deg. F. lengthens the life from three to five days, as compared with cooling after holding at 77 deg. F. for 24 hours, while cooling to 45.5 deg. F. immediately lengthened the life five days.

Again, the findings of the laboratory have been confirmed

*Presented at the Fourth International Congress of Refrigerating Industries held at London during June, 1924.

†Storage Investigations, Marble Laboratory, Inc., Canton, Pa.

‡Loading and Transporting Western Cantaloupes, by A. W. McKay, U. S. Dept. of Agriculture, Bul. Markets Doc. 10, June, 1918.

**Temperature Relations of Stone Fruit Fungi, by C. Brocks and J. S. Cooley—Journal Agricultural Research, Vol. XXII, No. 9—Washington, D. C., Nov. 26, 1921.

by the practical experiences of commerce. When precooled and loaded into chilled refrigerator cars of the standard type, peaches now reach destination after an ordinary haul in excellent condition throughout. When precooling is not possible, heavily iced cars and the storing of the load to permit air circulation has, in many cases, resulted in practically no decay at destination.

Checking Respiration by Lower Temperatures

The studies of the plant pathologists on field and orchard diseases, wether of fungoid or physiological origin, are, as they should be, directed primarily at eliminating the source of the trouble. Nevertheless, they furnish facts to the carrier, also, by which the destruction or deterioration of the affected commodity may be reduced to a minimum. In general, such facts bear directly upon ventilation and low temperatures.

An actively respiring vegetable or fruit, such as the tomato or the banana, if loaded warm into a refrigerator car and so stored that respiration gases cannot escape, might readily suffer a reduced resistance of its tissues and so become an easier prey of the various fungus diseases. However, low temperatures check respiration without, in most instances, lowering vitality and thereby lengthening the life period. They also inhibit, as we have seen, the growth of fungi, so doubling the protection. In addition, they produce a firmness of the tissues which reduces the liklihood of mechanical injuries upon which so many fungi depend for entrance into the cells of the host. This is notably the case with cherries and berries, as determined by Hawkins and Sando;* and with tomatoes.† When one considers that the carload of tomatoes is frequently 26,000 lb., it can be readily seen that enormous profits would accrue if the cars were precooled and iced for at least the first few days of the haul, to improve flavor, uniformity of color, increase firmness and, above all, to reduce such losses in transit from rotting as have been described by Rosenbaum‡ in his research on the spread of rots in tomatoes during transportation.

Temperature Below 50 Deg. F. Imperative

It is of great economic significance to shippers, merchant and carrier to note, as indicated in this brief discussion, that in general inhibition of decay in fruits and vegetables by temperatures below 50 deg. F. is of commercial importance. Furthermore, it may be said that many of the most destructive rots are almost entirely checked at temperatures near 40 deg. F. Conversely, it has been shown that such infections and diseases frequently thrive luxuriously at temperatures between 55 deg. and 60 deg. F. which are only too apt to prevail, at least in the upper and middle portions of the refrigerator cars of the various older type, most of which have box bunkers, open or non-insulated bulkheads, floor without racks and sometimes have only ¼-in. of a rather poor insulator over the entire body of the car.

On the other hand, the temperatures on the top layer and in the middle portion of a well iced, not overloaded refrigerator car of the standard type can readily be reduced to 45 deg. F. or less, and in a much shorter period of time. Moreover, with a little intensive refrigeration, it is possible practically to precool the load in transit, to the great advantage of such perishables as berries, cherries, peaches and such like commodities which, at best, have a limited life period.

Light Salting of Ice in the Transportation of Fruit

Formerly, only dressed meats, poultry and hard frozen commodities were moved under "beef icing," that is, with a certain amount of salt mixed with the ice in the bunkers. Now, for small fruits and other very perishable products and for those which should be quickly cooled, such as eggs, the addition of from one to three per cent of salt, or even more, in the initial icing and in the first and second re-icing, is a common, and a very successful practice, provided the refrigerator car is equipped with basket bunkers, insulated bulkheads and an adequate floor rack, all of which are necessary to equalize air circulation and so promote heat absorption from the lading in the middle half of the car. By an intelligent use of salt with the ice, it is possible to produce almost any temperature above 20 deg. F. desired and to have a maximum difference in high and low temperatures of only a few degrees after the temperature of the lading and of the car walls have come to an equilibrium.

One of the deterrents to a more general use of salted ice in refrigerator traffic is the common opinion that perishables freeze at 32 deg. F. That all cell sap contains some solids in solution, which depress the freezing point, is universal laboratory knowledge, but possessed only occasionally by the laiety. Since the actual freezing points of foods (temperatures at which ice crystals form in the product) moving under refrigeration are important from the viewpoint of protection from excessive heat, as well as from frosting in winter shipments, there follows a series of observations made by Wright and Taylor§ and compiled from their publication. There are differences in freezing points due to cultural conditions and to the varieties, but these are too small to require consideration in connection with transportation and, therefore, averages only are quoted.

When applying these figures to commercial problems, it must be remembered that the freezing points "should be considered only as danger points at or near which, either above or below, there is a possibility of freezing injury if exposed for a sufficient length of time".

AVERAGE FREEZING POINTS OF FRUITS AND VEGETABLES
(Wright and Taylor)

Fruits	Temp., deg. F.
Apples (summer)	28.44
Apples (winter)	28.51
Bananas—	
Green { peel	29.84
Green { pulp	30.22
Ripe { peel	29.36
Ripe { pulp	26.00
Blackberries—	
Black	29.15
White	28.40
Logan	29.51
Cherries	27.81
Cranberries	26.70
Currants	30.21
Gooseberries	28.91
Grapes (eastern)	28.16
Grapefruit	28.36
Lemons	28.14
Oranges	28.03
Peaches	29.41
Pears (Bartlett)—	
Hard ripe	28.46
Soft ripe	27.83
Pears (Japanese variety)	29.39
Persimmons (Japanese)	28.33
Plums	28.53
Raspberries—	
Red	30.41
Black	28.76
Strawberries	29.93
Vegetables—	
Beans (snap)	29.74
Cabbage	31.18
Carrots	29.57
Cauliflower	30.08
Corn (sweet)	28.95
Egg plant	30.41
Kohl-rabi	30.02
Lettuce	31.20
Onions (dry)	30.09
Peas (green)	30.03
Potatoes (Irish)	28.92
Potatoes (sweet)	28.44
Tomatoes (ripe)	30.38
Turnips	30.23

*Effect of Temperature on Resistance to Wounding of Certain Small Fruits and Cherries, Hawkins and Sando, U. S. Dept. of Agriculture Bulletin No. 830.

†The Process of Ripening in the Tomato, Considered Especially from the Commercial Standpoint, Chas. E. Sando, U. S. Dept. of Agriculture, Bulletin No. 859.

‡The Origin and Spread of Tomato Fruit Rots in Transit, Joseph Rosenbaum Phytopathology, Vol. 8, No. 11, pp. 572-780.

§The Freezing Temperature of Some Fruits, Vegetables and Cut Flowers, R. C. Wright and George F. Taylor, U. S. Dept. of Agriculture Bulletin No. 1133.

The Temperature of the Air at the Bunker

The temperature of the air issuing from the bunkers of a well-built standard refrigerator car is about 34 deg. F. For commercial purposes it may be assumed that this temperature will fall one degree for each per cent of common salt added to the ice. Lettuce and cabbage are the only vegetables commonly shipped in carloads which have the freezing point a little above 31 deg. F. All the usual fruits and berries freeze well below 31 deg. F., therefore it may be accepted as safe and practical to add from three to four per cent of salt to the initial ice when delicate plant products are to be transported; or when, as has already been shown, certain field or orchard diseases are to be controlled by lowered temperatures.

When re-icing, with salt added, the fall in temperature is generally less than one degree F. for each per cent of salt, reckoned on the basis of incoming ice, because while bunkers may be one half or more filled with the remains of the original ice and salt mixture, it has lost a greater proportion of salt than of ice in the drained off brine. If desirable, compensatory quantities of salt can be provided for in the icing in transit instructions.

It must not be inferred that light salting of the ice will maintain temperatures throughout the lading equal to those of the air at the exit from the basket bunker. There is invariably some leakage of heat through the car walls to be taken care of. However, when the car is not overloaded and the lading is placed to facilitate air circulation as much as possible, the top layer, which ordinarily shows the maximum temperatures, can be kept below 40 deg. F. even with the outside temperatures touching the 100 deg. F. mark occasionally and averaging 80 deg. F. or more.* With such outside temperatures as commonly prevail throughout the greater portion of the year and the shipping territory, intelligent light salting of the ice, especially on the initial icing, will result in less than five degrees difference between the high and low temperature points in the car which as previously stated, can be fairly well predicated and maintained in a car of standard construction.

That such light salting is most efficient in reducing rots because it insures temperatures approximately 40 deg. F. or below and, in the standard car, does not freeze the product at the bulkheads, is readily inferred from the foregoing discussions in this paper. It is also proved by actual investigation, such as already quoted on cantaloupes where the number of too soft melons dropped from 86 per cent in a car with temperatures over 47 deg. F. to 9.8 per cent in a car showing 39 deg. to 42 deg. F. and which had been salted with 500 lb. of salt to each bunker on the initial icing, 180 lb. to each bunker on the first re-icing and 100 lb. on the second re-icing. Because the melons themselves were over 80 deg. F. when loaded, it was quite safe, in the car of the standard type, to add 10 per cent of salt. Had they been below 80 deg. F., not more than five to eight per cent would have been added. A similar result is obtained when shipping strawberries. Ridley† has shown that, when the fruit is 60 deg. F. or over, 3.5 per cent salt can be used on the initial icing, and one per cent in the re-icing. He states that Rhizopus nigricans, Ehrb., which causes a large part of the strawberry decay in transit, is checked for a week or more by temperatures between 46 deg. and 50 deg. F. provided the chilling is immediately after picking. With 3.5 per cent salt and a car of the standard type, all the berries, which had an entering temperature of 75 deg. F., or over, were reduced to 40 deg. or less in 15 hours after loading.

The ability to maintain in transit such temperatures as 35 deg. to 45 deg. F. opens up great possibilities for the wider distribution of delicate tropical fruits and vegetables such as figs, mangoes and nectarines and an easier marketing of berries and small fruits.

The Transportation of Eggs

The refrigeration of eggs in transit is a problem which is not far distant from that of fruits and vegetables. Like them, eggs are commonly carried under moderately low temperature refrigeration. Eggs are similar too in their need for quick chilling if not already precooled before loading. Their freezing point is between 27 deg. and 28 deg. F. Stale eggs freeze at a lower temperature than fresh eggs. If the shell is sound, eggs will stand heavy undercooling and come back to normal without injury if the warming is gradual and without jarring.

Transporting eggs without causing physical damage is a more difficult matter than maintaining low temperatures. The commercial egg packer has striven to maintain sound shells rather than to obtain quick cooling. To prevent breakage the eggs in the package must not move, nor must the cases in the car shift. This end can best be gained by fitting the eggs and the packing tightly into the cases and the cases tightly into the car. But so doing makes cooling in transit a difficult matter. Below 60 deg. F. there is no proliferation in the germinal spot of fertile eggs. But evaporation and enzyme action progress and both seriously lower the commercial value of the egg. Just as in plant tissues, molds and bacteria which succeed in penetrating the shell make inroads at 50 deg. F. which are markedly lowered at 45 deg. F. and so inhibited at 40 deg. F. that they are without menace during even the maximum railroad haul.

The two dangers which the egg has to face are heat and water. An egg shell which is or has been wet is always liable to infection. High temperatures cause rapid deterioration from enzyme action, even if fungi are absent. To prevent evaporation of moisture in transit is of the utmost importance. In the packing and shipping of eggs intended for cold storage only those which are clean and dry are used and care is taken to maintain low temperatures. Hence, most of the eggs which go into storage are shipped under plain icing in refrigerator cars. Many, especially from large packing houses, are precooled, in which case the tight package and tight stowing is an advantage.

But the eggs gathered and transported after the storage season, or during the latter part of it, when the weather is warm, and loaded by small concentrators who do not have precooling facilities, are at a great disadvantage unless the refrigerator car is thoroughly efficient. Very frequently, in cars which are under-insulated and without sufficient air circulation, the top layer, when the cases are loaded four high, will reach 75 deg. F. and will never fall below 55 deg. F. Ordinarily, about four days are required to reduce the temperature of eggs loaded at 70 deg. F. to between 45 deg. and 55 deg. F.‡ In midsummer when the need of adequate refrigeration is greatest it is seldom that the packages on the top layer are below 50 deg. F. when destination is reached, even if the car is of the standard type.

Temperatures Lowered by Means of Salt

Again, light salting at the initial icing and for one or two re-icings largely solves the problem; and again, this salting should be confined to a car having basket bunkers, insulated bulkheads and a floor rack, else there is a damming up of low temperatures at the bunker which may cause frosting and yet the top layers remain too warm. From three to five per cent of salt can be used if the temperatures of the eggs is above 70 deg. F. on the initial icing and about one per cent at two re-icings unless the haul be unusually long and

*Loading and Transporting Western Cantaloupes, A. W. McKay, U. S. Dept. of Agriculture, Bureau of Markets, Doc. 10, June, 1918.

† Factors in Transportation of Strawberries from the Ozark Region, V. W. Ridley, U. S. Dept. of Agriculture, Bureau of Markets, Doc. 8, March, 1918.

‡The Prevention of the Breakage of Eggs in Transit when Shipped in Car Lots, M. E. Pennington, H. A. McAleer and A. D. Greenlee, U. S. Dept. of Agriculture, Bul. No. 664.

outside temperatures very high, when it may be desirable to add one per cent of salt on alternate re-icings. Such treatment will reduce top layer temperatures to 45 deg. F. or less, and shorten the cooling time by 24 hours.

Salting

Packing house products, dressed poultry and frozen fish have so long moved under beef icing that the requirements of these commodities are generally known and need but slight mention in this paper.

The refrigerator cars most commonly used for dressed meat are provided at each end with metal cylinders to hold the mixture of ice and salt. The amount of salt used is generally from 10 to 15 per cent. These cars have a solid, but not insulated bulkhead, and a rack on the floor. They are intended primarily to carry chilled or frozen products which are supposed to enter the car with a lower internal temperature than the car can maintain. They are not adapted to the task of chilling a warm load because of a very sluggish air circulation. Generally they are better insulated than the old styles of line refrigerators, but not better than the cars of the standard type.

It is the aim of the packer of dressed meat to maintain temperatures at the top of the load, which in this case hangs from the ceiling, below 38 deg. F. The most delicate of his products, such as pork loins, sweetbreads and the like, are boxed and loaded on the floor rack. They can be held at 35 deg. F. or less. Generally, unless the load is hard frozen, the packer prefers to just escape freezing the products near the brine tanks and, at the same time, to maintain safe temperatures at the top of the load.

In the old line cars heavily salting the ice in the box bunker, with open bulkheads and no space on the floor under the load to permit a quick diffusion of the air which issues at temperatures below 20 deg. F., caused such a rapid absorption of heat from the nearby packages that their contents froze while, just as in the case of other commodities carried in these cars, the middle of the load suffered from excess heat. The cars of the standard type, as will readily be deduced from previous statements in this paper, are not so handicapped. They will maintain the same temperatures as the beef cars and, if the insulation is equal to that in the beef car, with approximately the same ice meltage. For the hauling of chilled lading, however, the bunkers of the standard car hold more ice than is necessary provided icing stations are not more than 36 hours apart.

The efficiency of line refrigerator cars under heavy salting is of primary importance to the independent poultry packer and fish dealer who does not own his carline. In the box bunker car the lading, even with very good treatment, would show a temperature variation of 15 deg. F. between the floor at the bunker and the top of the load between the doors. With the standard car the lading at the bunker will carry with great evenness at 30 deg. F. while the top of the load, about four feet above the rack, will just as consistently maintain 35 deg. F. These, it must be remembered, are the temperatures *in the commodity*—not in the air of the car, which will show greater, but short period, variations.

More and more frequently are the line refrigerators being depended upon to haul this kind of traffic, even by the beef packers, when their peak load season is on. Much of the success of such an adaptation depends upon intelligent treatment at icing stations. A routine for the salting of dressed beef cars has been a gradual evolution. Such a routine for line refrigerators will come. It must be remembered that the dissolving of the salt and its exit as brine is relatively greater than is the meltage of ice. Therefore, should only the initial percentage of salt be added to the incoming ice at re-icings, there will be a gradual reduction of the proportion of salt and a consequent rise in temperature. Such a condition must be met by adding more salt at icing stations, on some general basis which will be evolved as the traffic is better understood.

The tremendous advantage to shippers and consumers of dressed poultry of such low temperatures as our modern refrigerator cars maintain is grasped when one considers that, in a five day haul the deterioration as measured by the amount of ammoniacal nitrogen in the birds carried from 35 deg. to 39 deg. F., was three times as great as in those carried at 30 deg. F. This spread at destination grew steadily wider throughout the marketing period.*

Conclusion

In the half century of the refrigerator car in the United States there has, as we have seen, been developed an appliance and a routine which has served almost to annihilate season and distance so far as perishable foods are concerned. The refrigerator car and the service attending it are responsible for the existence of the citrus groves of California and Florida; for the Brownsville, Texas, community and its vast vegetable output; for the Oregon and Washington apple orchards; for the poultry and eggs of the Mississippi Valley and for many other agricultural enterprises which furnish livelihoods and foods to our people.

To do this there are now approximately 143,700 refrigerator cars winding over prairies and climbing mountain ranges, headed north, south, east and west that various products of the land may be available to the people of every section. Icing stations dot the routes, approximately 24 train hours apart. What a herculean task they perform may be gathered from the activities of one of them, where, in 1923, 142,739 cars of perishables were re-iced, divided as follows: meat, 50 per cent, fruit 40 per cent, dairy and miscellaneous 10 per cent. While the number of meat cars at this station is above the average, another icing station would show just as great a plurality of fruit cars and another of dairy freight. For these 142,739 cars there were used 120,000 tons of ice, all made at the station. During the peak hours of the day 100 cars an hour may have to be handled, and on peak days more than 1,000 cars are re-iced, classified and sent to appropriate trains.

That food may not fail, and that it may be wholesome! That aim has led from one improvement to another in the construction and operation of our refrigerator cars. Just now we are realizing as never before the significance, in terms of economic and bodily welfare, the meaning of the lowered temperatures in transit which are more and more frequently becoming an everyday routine.

*Refrigeration of Dressed Poultry in Transit, by M. E. Pennington, et al, U. S. Dept. of Agriculture, Bul. No. 17, from Bureau of Chemistry, 1913.

Transportation Building, University of Illinois

Conference on Utilization of Forest Products

Forest Service Seeks Co-operation of Industries to Forestall Timber Shortage

WASHINGTON, D. C.

NEARLY 400 delegates, representing every branch of the lumber growing, manufacturing and consuming interests, attended the National Conference on Utilization of Forest Products held at Washington on November 19 and 20, called by the late Secretary Wallace of the Department of Agriculture to obtain national recognition of the need for steps to perpetuate the supply of and bring about better utilization of forest products. The first day and a-half of the program was devoted to the presentation of addresses and papers dealing with various phases of the subject, which were to be followed on Thursday by the establishment of a nationally representative advisory committee to assist the Secretary of Agriculture in formulating and carrying out adequate measures to insure the most efficient development and use of our forest resources. A considerable number of railroad officers were among those participating, and the program included a paper by R. H. Aishton, president of the American Railway Association, on "The Railways and Wood Preservation," which was presented by Julius H. Parmelee, director of the Bureau of Railway Economics.

President Coolidge opened the conference with an address urging better methods of utilization of timber in order to conserve the country's remaining forest resources. To bridge the gap between timber consumption and timber growth calls for thrifty and economic measures by the wood-producing, manufacturing and consuming industries, he said.

"This conference has been called for the purpose of further attempting to deal with the problem of our national timber supply," said the President. "One of the chief items in that problem is the present appalling waste. Some of this waste may be unavoidable, but to a large extent it is unnecessary. The time is at hand when our country is actually confronted with a timber shortage that can be remedied in only two ways: by diminishing the present waste and increasing the present supply.

"Strange as it may seem, the American people, bred for many generations to forest life, drawing no small measure of their wealth from the forest, have not yet acquired the sense of timber as a crop. These immense stretches of cut-over land, mostly too rough or too sterile for tilling, have not awakened us to their vast potential worth as growers of wood. Fully one-fourth of our land area ought to be kept in forest—not poor, dwindling thickets of scrub, but forests of trees fit for bridges and houses and ships.

"We hold the resources of our country as a trust. They ought to be used for the benefit of the present generation, but they ought neither to be wasted nor destroyed. The generations to come also have a vested interest in them. They ought to be administered for the benefit of the public. No monopoly should be permitted which would result in profiteering, nor on the other hand should they be indiscriminately bestowed on those who will unwisely permit them to be dissipated. These great natural resources must be administered for the general welfare of all the people, both for the present and for the future. There must be both use and restoration. The chief purpose of this conference is to discover policies which will, in the hands of private individuals and of public officers, tend to further advancement of this already well-defined and securely adopted principle."

The President in his address said that the freight bill on forest products amounts to some $250,000,000 a year, much of which might be better used in developing new supplies instead of paying for transportation from distant sources.

Secretary Hoover of the Department of Commerce also addressed the conference briefly, calling attention to the work of his department in encouraging industry to devise ways of eliminating waste and to develop the principle of self-government in industry which will bring about such changes as are economic in themselves and at the same time in the public interest. He was followed by J. Walter Drake, Assistant Secretary of Commerce, who went more into detail regarding its activities toward bringing about better utilization of lumber. Mr. Drake made the point that the efficiency of modern transportation has helped to develop habits of tremendous extravagance in the American people in their utilization of natural resources which have brought about an enormous increase in per capita consumption and production.

Acting Secretary Howard M. Gore, of the Department of Agriculture, following the President's address, welcomed the delegates and declared that the entire resources of the Department of Agriculture, Forest Service, are dedicated to the problems arising from an ever-growing timber shortage. Both the public and the wood-using industries, said Mr. Gore, will be served by the deliberations of the conference.

"Drawn from many diverse groups and occupations, the members of this conference have at the present moment a single united interest—the interest of timber saving," Acting Secretary Gore stated. "As I see it," he continued, "the purpose of this meeting is to perpetuate and give practicable expression to that unity of interest. How can this purpose be put into effect in the woods and mills and shops where timber is manufactured, in the markets where it is bought and sold, and in the structures and commodities where it is used? Research has uncovered large preventable losses and has developed many methods of reducing them. The Department of Agriculture wants to see more of this knowledge put into every day use. It is knowledge of the sort that will repay not only the public but also the user. In the opinion of the Agricultural Department the effectiveness of this conference lies in organized industrial effort. Joint effort alone offers a solution of the problem of how the remaining timber resources of the United States can be used most economically and effectively."

W. H. Greeley, chief of the Forest Service, outlined to the conference the principal sources of wood waste in timber producing, manufacturing and consuming industries, declaring that around six billion cubic feet of timber can be saved every year by more efficient methods of utilization.

"The forest lands in the United States produce about six billion cubic feet of timber annually," said Mr. Greeley. "This amount of new growth represents what can be saved by the practice of known methods of utilization. An additional six billion cubic feet can be saved eventually by methods which are being constantly developed and improved through forestry research.

"Large wastes in the utilization of timber is a well-recognized fact. All citizens are responsible for this condition, and all must share in the problem's solution.

"In the trinity of forest conservation which has guided the country's public activities and policies," continued Mr. Greeley, "the most efficient use of the existing supply of timber stands on an equality with the protection of all forest resources and the growing of new timber crops.

"The United States is not the first country to face a tim-

ber shortage. Western Europe had one and pulled through. Asia Minor and China each have had one and failed to pull through. Saving in the utilization of our timber was recognized as a vital part of forest conservation when we began to ask whether our future path should follow that of China and Asia Minor or that of Western Europe.

"In the field of consumption the problem becomes one of lengthening the life of railroads, buildings and other structures where wood is employed, of reducing the cost of maintenance and replacements, and of finding fresh forms of raw material or more economical ways of using raw material. The difference between the public viewpoint and the industrial viewpoint is no other than that which exists in practically every other development having to do with natural resources or national economy. It is a difference in viewpoint only, as between the direct interests of the individual and the broader interests of the nation. The fundamental possibilities of benefit are the same, and the mutuality of interest is so great as readily to afford a basis for making a joint effort.

The Bearing of Transportation on Timber Supply

"It is worth pointing out that the United States is the first country where the exhaustion of timber in one section could be readily met by the cutting of forests 2,000 miles distant. Our transportation system has largely concealed the ultimate outcome of the exhaustion of old growth timber. Because of our transportation system, we have practically pooled all of the old growth stumpage in the United States and maintained our enormous use of forest products with no other ill-effect, from the standpoint of current consumption, than higher freight bills. From many standpoints this is a national blessing. On the other hand, it is dangerous because it permits practically a nation-wide depletion of high quality timber before any very serious local effects, in any part of the country, may be experienced. We are in danger of coming up short, almost overnight, against a depletion of virgin timber so serious as to cause disastrous public and industrial consequences.

"The point I would emphasize is that this marvelous tool of transportation, which has been such a large element in meeting national requirements, ought to be employed with equal effectiveness in carrying out the economies now forced upon us. Our transportation system ought to make a local surplus of waste timber or inferior woods nationally available to the markets where they can be profitably utilized. Transportation ought to make it possible for local mill or woods waste to reach the plants and markets for box material, pulp and fiber products, small dimension stock, and the like. An official of an important New England railroad recently proposed that low grades of lumber be given lower freight rates in order that the railways may get the benefit of the traffic. If this proposal is sound from the standpoint of the railroad, it is doubly sound from the standpoint of timber conservation. I have never been convinced that the principle of lower tariffs for low grade lumber or the waste products of a particular group of industries, enabling such materials to reach the points where they can be used, could not be much more widely applied in the United States."

Mr. Greeley also said that the lodgepole pine timber on a number of National Forests in the central Rocky Mountain region is now being cut extensively for railroad cross ties. The ties cost about $1 each delivered at the railroad. In some instances they are given a zinc chloride treatment at a cost of about 20 cents per tie, which lengthens the serviceable life from six years to thirteen years, an increase of over 100 per cent. Excluding interest items and installation costs, the cost per tie per year of service is thus roughly 10 cents for the treated tie as against 17 cents for the untreated tie, aside from the fact that the treatment proporionately prolongs the local source of ties available to the transcontinental railroads. Yet quantities of untreated ties are still being put into permanent railroad tracks in this region.

Mr. Aishton's paper follows:

The Railways and Wood Preservation

By R. H. Aishton
President, American Railway Association

The railways of the United States have a very large and real interest in the timber output of the country, and in its preservation and utilization to the best advantage. Not only do the railways haul a large proportion of the annual timber cut, in the form of lumber and other forest products, by rail, but what is more important for the purposes of this discussion, they are the direct or indirect purchasers of a quarter of the total lumber output. Considered from another angle, the railways expend more money for lumber than for any other kind of material except fuel.

A number of special studies have been made by the Bureau of Railway Economics in this field. During the year 1923 the large (Class I) railways of the United States purchased approximately 2,388,800,000 board feet of lumber for which they paid nearly $100,000,000. About 113,900,000 cross ties, both hewn and sawed, were also purchased, for which the railways paid about $125,000,000. For other products of forests, such as poles and posts, the railways in 1923 spent nearly $8,000,000 more. The total direct expenditures of the railways for forest products thus amounted to about $233,000,000.

Assuming that the average cross tie contains 32 board measure feet, the ties and lumber purchased directly by the railways in 1923 amounted to approximately 6,000,000,000 feet. During 1923 the saw mills of the United States produced approximately 35 billion feet of lumber, which does not include hewn ties. If it be assumed that the total production of lumber and hewn ties was not more than 40 billion feet, it would appear that in 1923 the railways purchased directly about 15 per cent of that total production.

These figures cover only the direct lumber purchases of the railways. If the lumber purchased indirectly for the railways by equipment manufacturers and railway building contractors be included, these figures would be increased considerably.

In this connection, two years ago the Bureau of Railway Economics made a special study for the President's Unemployment Conference, with reference to the stability of railway employment and of railway purchases. In the course of this study the normal annual purchases of various kinds of materials during the five-year period from 1910 to 1915 were ascertained. On the basis of these results arrived at in the study, it is estimated that the railways purchase directly 17.5 per cent of the annual timber cut of the country, and indirectly purchase 7.5 per cent, or a total for both direct and indirect purchases of 25 per cent.

If these statistics are indicative of the situation at the present moment, then the railways absorb about one-fourth of the timber cut each year, and expend nearly a quarter billion dollars for lumber products of various kinds. Their interest in forest conservation is therefore no small one, and any effort on their part looking to a longer life of the ties and other lumber they use is well worth while.

Fortunately, it can be shown that the railroad companies were pioneers in the wood preserving game, and that they have been actively engaged for more than 85 years in developing methods of wood preservation.

Railroad's Contribution to Wood Preservation

Railroad attention to wood preservation began in this country in 1838, when kyanized chestnut ties were laid down on the Northern Central Railroad in Maryland. Its

value was demonstrated eleven years later when the ties were examined and found to be sound, while untreated ties had become useless. This particular incident is of interest for two reasons: first because it shows that the railways were among the first, if not the first, to experiment with the problem of wood preservation through chemical treatment, also because the original experimentation took place within a short distance of the national capital, on what is now a part of the Pennsylvania Railroad System.

The first treating plant in the country worthy of the name was established in 1848, at Lowell, Mass., by the proprietors of canals and locks there. It consisted of two wooden tanks, each 50 feet long, 8 feet wide and 4 feet deep, in which lumber was immersed in accordance with the kyanizing process, using bichloride of mercury.

From these modest beginnings have evolved the scientifically planned wood-preservation plants, 135 of which were in operation last year; 29 of these are owned by railroads and specialize in the treatment of railroad material. In addition, the railways patronize privately owned treating plants, where work is done for them under contract.

The year 1923 was a banner year in wood preservation by the railways, according to the Forest Service. In presenting the statistics, showing a 34 per cent increase over 1922 in the number of cubic feet treated, the Forest Service said:

"The railroads, the pioneers in the wood-preserving field, have long been cognizant of the economic value of treated wood. As a result, the bulk of material subjected to preservative treatment today consists of cross-ties, crossing plank, bridge and trestle timbers, and similar products of the forest in structural form essential to the very existence and continued operation of the transportation system of the country."

Since the railroads have been pioneers in wood-preservation, their records and studies are sought by other industries that use timber in quantities, and hence are forced to consider the elements of economy. Viewed as a whole, these records and reports on processes, specifications, mechanical preparation of ties and timber for treatment, properties of treated woods, of various kinds, and methods of combatting marine borers, to mention a few of the subjects which have engaged the attention of railroad men in connection with wood preservation, afford distinct contributions, not only to more efficient and economical utilization of timber, but also to the sciences of chemistry and biology.

Moreover, the results of these investigations are readily available to those interested, in the published proceedings of the American Railway Engineering Association, which is the Engineering Division of the American Railway Association; the American Wood Preservers' Association, and similar associations.

In the early years of their investigations the railroads worked practically alone. There was no Forest Service in 1838, when the Northern Central tried out kyanized ties, nor was there one in 1848 when the Lowell canal proprietors built their little treating plant, nor even in 1867 when the Southern Pacific established its burnettizing plant. In fact, while individual roads had been investigating processes and treating lumber for years, it is only within the past 25 years that definite progress has been made and an extensive interest in the subject has been taken.

When the American Railway Engineering Association—then known as the American Railway Engineering and Maintenance of Way Association—held its first meeting in 1900, the Committee on Ties reported that the subject of wood preservation was one of lasting interest, to be studied over long periods of time with annual progress reports. Discussion of this report brought out the fact that data from individual roads were available, and that the material collected by Octave Chanute, a consulting engineer of Chicago, on European practice—for all ties in Europe are treated—was at the disposal of the committee.

By 1909 the material had become so extensive, and the continued study of the subject required so much effort, that the American Railway Engineering Association established a Committee on Wood Preservation, with instructions:

"To cover in general the investigating and reporting on the preservation of wood used for ties and for railroad structures and buildings, confining the work of the committee more particularly to processes, methods and results obtained.

"To present a recommendation as to the outline of the work for the committee, with suggestions of the classification to be followed.

"Continue the work heretofore done by the Committees on Ties and on Wooden Bridges relating to the special subjects of processes and methods of wood preservation."

From the work of the railroads in studying their own problems, and in co-operating with individuals and associations working along the same lines, have resulted specifications for preservative treatment of various kinds of wood. These are included in the Manual of the American Railway Engineering Association as recommended practice; detailed data are constantly being added, based on the service records of railroad ties.

Investigations of mechanical treatment of ties and timber were made necessary by the fact that a treated tie may be destroyed by mechanical action long before it decays. The first report of the Committee on Wood Preservation said:

" . . . The present general American method of rail fastenings is not ample and not efficient. It is essential in order to obtain the full economic life of a preserved tie to improve the fastening by providing greater bearing surface and by the use of screws or screw spikes."

More spectacular than these quiet and exhaustive investigations, which have been of such value in determining more effective utilization of wood on land and in fresh water, are the investigations in which railroads have been participating, along with the Forest Products Laboratory, shipping concerns, and even the Chemical Warfare Service, into methods of checking the ravages of marine borers.

These tiny and destructive creatures have long been known and studied by individuals. But, as in the case of the railroads' early work in connection with wood preservation, no thoroughly organized scientific effort was made until threatened disaster goaded those concerned into activity.

With the increase of shipping in various harbors came an increase in the destructive activity of marine borers, and the study of these borers underwent first the process of investigating and co-relating existing data, and then the drafting of recommendations in regard to preservatives and construction materials.

Studies are being made on the Atlantic, Pacific and Gulf Coast, and the National Research Council has been co-operating. The Chemical Warfare Service, through its studies of war gases and chemicals and their effects on living tissues, has accumulated data which is apparently of great value in the peace-time war on marine borers. Meanwhile, the railroads are continuing their investigations and reports, both on measures for temporary protection against the borers, where expense of permanent protection is not justified, and on methods of permanent protection.

Thus the railways have been actively engaged for years on every phase of the problem of wood preservation. In fact, it is not too much to say that they have been the leaders in the movement. Such a statement finds its support, among other things, in the fact that 90 per cent of all the lumber which is treated each year in the United States is railway lumber; that is, is utilized by or for the railways in their construction and maintenance work.

Turning to some of the specific subjects related to the treatment of forest products, the following extract from a

report made in 1919 by Mr. George Yeomans is of interest. Mr. Yeomans, who at the time was Assistant Director of the Division of Purchases of the United States Railroad Administration, and was discussing the establishment of a bureau for the purchase of cross ties, said:

"The use of treated cross ties has steadily increased since their introduction 34 years ago, until, at present, about 33 per cent of the total number used each year are treated. This has had the effect of reducing the number to be procured annually for renewals by over 20,000,000 ties and the extension of the use of preservative treatment to the remaining two-thirds of the yearly supply would result in a still further reduction of about 45,000,000 per annum."

Statistics from the Forest Service of the United States Department of Agriculture show that 53,610,175 railroad cross ties were treated in 1923, which was 12,293,701 more than were treated in 1922.

Reducing these ties to cubic feet, and adding all other forms of timber which were subjected to preservative treatment, it appears that the total amount so treated by the railways was greater in 1923 than for any preceding year of record.

Use of Paint by Railroads

Much is said these days about saving all if you save the surface, and more attention to painting to improve appearances, sanitary conditions, and lighting is being paid by all industries.

But long before there was any widespread general interest, the Master Car and Locomotive Painters' Association, organized in 1870 to discuss paint in all its relations to railroad purposes, had been studying painting processes and formulæ, and testing then year after year.

Remembering that wooden cars were generally in use up to recent years, it is not too much to say that a large part of our available knowledge regarding the value of paint as a wood preservative is due to the efforts of the painters of the railroads. The Master Car and Locomotive Painters' Association was merged into the American Railway Association in 1920, and its proceedings are now known as those of the Equipment Painting Section of the Mechanical Division. These proceedings, along with the 48 other volumes issued by the association under its own name, afford to those interested an extensive excursion into applied chemistry, and the adaptation of painting methods to climate, usage of equipment, and buildings for railway purposes.

Another group of railway men who are interested in paint as a preservative of structures, wooden and otherwise, is the Committee on Buildings of the American Railway Engineering Association. They have recommended a form for recording all painting work done on railway buildings in order that unsatisfactory paints can be eliminated, and that the appearance of railway property protected by paint can be kept up to the highest standards.

Prevention of Mechanical Wear

About 10 per cent of the cross-ties fail by reason of mechanical wear. Mechanical wear means the cutting into the tie by the rail, and the killing or disruption of the wood fibres by spikes driven into the wood, thus opening up the interior of the wood to the action of the fungi, eventually causing decay and hastening the process. Decay breaks down the structure of the wood and weakens it beyond the power to withstand mechanical wear. The two processes of tie destruction facilitate each other. Mechanical wear thus undoubtedly hastens decay, and reduces the life by several years.

To overcome this difficulty, railroads are now using a tie-plate inserted between the rail and tie. Without a device of this character, many of the softer woods now used for cross-tie purposes could not be utilized. Improvements in this device are being constantly made to afford even greater protection.

Railroads have found that this is one of the most important questions in connection with obtaining the maximum life of lumber and timber. The results obtainable depend in a large measure on the care given the material after its delivery to the railroad. Maximum results cannot be expected if the material is abused while stored and handled. Bearing this important fact in mind, regulations have been formulated and promulgated to the track forces, indicating specifically how the lumber and timber is to be stored, piled, handled and installed in the track.

In many situations it has been found feasible and economical to substitute other materials in place of wood for railroad purposes, thus reducing the drain on the timber supply.

For example, steel is being largely used for passenger and freight car equipment. Concrete is being employed to an increasing extent for buildings, trestles, piles, docks and wharves at rail-and-water terminals, coal chutes, water tanks, fence posts, telegraph poles, etc. These substitutes not only release wood for other uses, but reduce the fire hazard—an important consideration.

No satisfactory substitute for the wooden cross-tie has as yet been developed. Engineers, however, are giving this subject earnest thought and study, and it is believed that eventually a satisfactory substitute will be the result of progressive development.

Prevention of Fire Losses

Railroads traversing forest regions are vitally interested in preventing the spread of forest and field fires. As many forest fires originate on or near the railroad right-of-way, it has been natural for the railroad to combine with the state and other organizations in providing protective measures for this work. In certain states this obligation has been placed upon the railroad companies by state laws.

The legislation on fire protection affecting railroads is generally along the lines and requirements for locomotive spark arresters; for devices for preventing the escape of fire from ash pans and fireboxes; the prohibition of depositing fire, live coals, etc., on tracks or rights-of-way; the requirements of screening smoking-car windows, cleaning right-of-way, extension of cleaning at dangerous points to strips beyond the right-of-way; maintenance of fire patrolmen to follow trains in forest districts during danger seasons and notification by trainmen of fires observed in passing. Railroads are co-operating with these various agencies to prevent the destruction of property by fire.

Numerous ways in which railroads have conserved timber might be cited, such as the reclamation of old material and again converting it to some useful purpose so as to utilize it to the limit.

A number of railroads have undertaken tree planting and reforestation on lands owned but not required for railroad purposes.

It is a far cry from the simple methods of the Northern Central and the Lowell canal men to the complex activities of the Chemical Warfare Service, but the railroads have played no inconsiderable part in bridging the gap through the 85 years that they have provided investigators, money, and materials for the ever-expanding and ever-important subject of wood preservation, to the end that our timber supply may be utilized to the utmost.

The attitude of the railways in the past is a very clear indication of their policy in the future, particularly regarding their interest in the matter of wood preservation and conservation, which, briefly stated, is the utilization of every effort and every channel that will produce greater economy and efficiency in the operation and maintenance of the railway.

Executives Define Position in New Program

Ask That Railroad Problems Be Settled as Economic Questions, Not as Political Issues

RAILWAY EXECUTIVES held a series of meetings in New York on Tuesday and Wednesday for the purpose of considering the general transportation situation.

The board of directors of the American Railway Association held its quarterly meeting at the offices of the Association at 30 Vesey Street, on Tuesday morning, and on Wednesday, the member roads of the American Railway Association held their annual meeting at the Yale Club. At these meetings the performance of the railroads in 1924 was discussed and plans made for providing means of continuing the successful meeting of transportation requirements of the country during the coming year.

The annual meeting of the Association of Railway Executives was held on Wednesday afternoon at the Yale Club.

An important feature in connection with the meeting was the announcement that capital expenditures on the railroads in 1924 will exceed the total for 1923. The total for 1923 was $1,059,000,000. Authorized expenditures for 1924 total $1,077,000,000. At the meeting of the Association of Railway Executives on Wednesday afternoon a new program was adopted asking that railroad problems be dealt with and settled as economic questions "which they are, and not as political issues, which they are not." It was urged that there is no condition calling for urgent legislative action by Congress and that rate adjustments be left to the duly constituted governmental authorities. "Rate making by legislative action," it was urged "would be destructive." The importance of adequate transportation facilities was pointed out and the carriers put themselves upon record as determined to continue their policy of expansion.

R. H. Aishton Elected Chairman

At the meeting of the Association of Railway Executives R. H. Aishton, president of the American Railway Association, was elected chairman of the executive committee, succeeding Hale Holden, president of the Chicago, Burlington & Quincy, who desired to be relieved from the duties of chairman. Mr. Holden will continue as a member of the executive committee and W. L. Mapother, president of the Louisville & Nashville, was elected a new member.

Savings to Shippers from Railway Efficiency

The following statement was issued by the American Railway Association following the annual meeting of the member roads on Wednesday.

Through increased efficiency and economy in operation, the railroads brought about a saving in 1923 of $932,591,000 in operating expenses, a large part of which was passed along to the public in the shape of reduced freight rates.

The saving to the shipping public due to decreased freight charges in 1923 amounted to approximately $657,000,000, as compared with the rates in effect in 1921.

It has been generally recognized that the railroads of the United States have gradually improved the efficiency of their service to the public since the return of the railroads to private ownership on March 1, 1920. At the present time they are furnishing the most satisfactory service ever given in their history, both from the standpoint of car supply and prompt movement of the loaded traffic. While it is too early to ascertain the savings that have resulted from a continued efficiency in operation in 1924, there is no question but that it will prove to be in excess of that for 1923.

This estimate as to the total actual saving in dollars in 1923 due to increased efficiency is based on a comparison with operating expenses in 1920, which from the traffic standpoint was the heaviest year prior to 1923.

Since 1921, which marked the peak in freight rates as a result of the order of the Commission in Ex Parte 74, there has been a saving to the public, because of reduced freight rates, of approximately $1,373,000,000. Of the total reduction in freight charges, $380,000,000 was saved during the first eight months in 1924, $657,000,000 in 1923 and $336,000,000 in 1922.

1924 Authorized Capital Expenditures $1,077,000,000

The railroads of the United States on April 5, 1923, adopted a program to provide adequate transportation service. All the plans adopted at that time have been and are being carried out. The improvement in the transportation plant and the expansion of its capacity, including improvements in and additions to roadway facilities, locomotives and cars, involve very great capital expenditures made largely from borrowed money. These capital expenditures both for 1923 and 1924 follow:

	Capital Expenditures 1923	Authorized Expenditures 1924	Total
For locomotives	$208,966,280	$101,233,000	$310,199,280
For cars	472,757,711	412,264,000	885,021,711
For other improvements	377,425,435	563,800,000	941,225,435
Total.....	$1,059,149,426	$1,077,297,000	$2,136,446,426

Of the $1,077,297,000 of capital expenditures authorized for 1924, reports from the railroads of the country show that during the first nine months in 1924, $610,904,000 were actually expended. This would leave $466,393,000 in unexpended authorizations which are being spent constantly for new equipment, extension of plant facilities and other improvements.

While capital authorizations for locomotives and cars were somewhat less in 1924 than the capital expenditures in 1923 for the same items, there was an increase in 1924 over the preceding year in the amount of capital expenditures authorized for other improvements, which includes improvements to roadway, structures and extension of line.

New Records for 1924

The following statement summarizes the report of the Car Service Division of the American Railway Association submitted at the meeting of the board of directors.

Seven new high records for all time were established by the railroads in successfully handling this year, without car shortage or congestion, the enormous freight traffic offered to them by the shippers of the country.

The seven new high records were:

1. Greatest number of cars for any one week in history were loaded with revenue freight the week ended October 25 when the total was 1,112,345 cars. This exceeded by 14,852 cars the record of 1923 which remained the peak until this year.
2. The railroads for the week of October 25 loaded 72,474 cars with grain and grain products, the greatest number for any one week on record.
3. Loading of merchandise and less than carload lot freight totaled 259,617 cars the week of October 11, the highest record for any one week ever reported.
4. A new high record for any week in the loading of miscellaneous freight was made the week of October 25 when the total was 422,890 cars.
5. The railroads on Wednesday, October 15, moved 1,030,211 freight cars, the greatest movement for any one day in history. This included both loaded and empty freight cars.
6. High record in respect to number of surplus freight cars and serviceable locomotives in storage when loading of revenue freight was in excess of 1,000,000 cars a week. At the same time there was no car shortage or congestion due to railroad disability.
7. A total of 31,700,789 cars loaded with all commodities excluding coal, coke, and ore, for the period from January 1 this year to October 25. This was the greatest movement of these commodities on record, exceeding by 363,182 cars or 1.1 per cent the previous high record for the corresponding period established in 1923. Loading of all commodities except coal, coke and ore represents about seventy-six per cent of the total traffic.

"The records indicate," according to the report of the Car Service Division, "the heaviest loading of commodities in box cars during the year up to date of any similar period on record. There has been an equitable distribution of box cars between all sections of the country for the entire year, with a favorable situation as to cars on lines of their ownership and percentage of cars on line to ownership, particularly in the South Western, Central Western and North Western Regions. The very large agricultural production of the west has been handled without complaint or car shortage.

All previous grain loading records were broken on practically

all western lines as were also the receipts at terminal markets. The excellent records in the movement of grain have not been confined to the western territory alone. Grain handled through the Buffalo elevators during the season to the end of October exceeded all previous records. Throughout the entire season there has been a surplus of grain cars on hand at Buffalo and no shortage at any time.

"There has been no accumulation of traffic or congestion during the year 1924 chargeable to railroad disability. Such congestion or accumulation as existed during the year and which made embargoes necessary was due to inability of consignees to unload cars promptly on arrival."

In respect to the use of refrigerator equipment, the Car Service Division report said there has been an ample supply of refrigerator cars to meet all demands. The heavy demand of the fall months was in California where the crop was moved without car shortage. The supply of open top equipment has also been satisfactory, both for the movement of coal as well as other commodities using such equipment. The sugar beet movement in Michigan, which is estimated at 35 per cent greater than that moved last year, has been handled without difficulty, there being less delay to the cars engaged in that service than during any previous period while there has been no car shortage for the movement of that crop.

"No general orders," the report said, "requiring a movement of cars in volume from one section of the county to another were necessary this year. All that has been necessary to keep western cars returning promptly to owners in sufficient volume either loaded or empty has been to keep before the eastern and southern lines the necessities of the west and to call their attention to any loading of western cars that would not take those cars to their owners' rails."

Regional Advisory Boards

The report paid a tribute to the successful activities of the various shippers' regional advisory boards that have been organized in all parts of the country and which are made up of a membership representing all phases of agricultural and industrial production.

"Through the medium of these boards," the report said, "there has been general active co-operation on the part of shippers in loading cars to or in the direction of the owning lines. Their assistance in this direction is responsible in no small degree for the success of the railroads this year in providing satisfactory transportation for agricultural products. These organizations are functioning with very great satisfaction to shippers and railroads alike. They have proved very helpful to the Car Service Division in its work of car distribution. We confidently look forward to even greater accomplishments in the future in transportation service and efficiency through the medium of these Boards."

The ability of the railroads to handle successfully the enormous traffic offered them this year has also been largely due not only to additions to the railroad plant and improvement in operation brought about through large financial expenditures, but also to a speeding up in the movement of freight and greater efficiency in operation.

From August 1 to November 1, inclusive, 13,497,655 cars were loaded with revenue freight compared with 13,672,035 cars during the corresponding period last year, a decrease of only 174,380 cars or 1.3 per cent. Considering the fact the Class I railroads during the same period this year, which are the months of heaviest freight traffic, had a daily average of 173,620 surplus freight cars in good repair compared with 53,425 during the corresponding period last year and also had approximately a daily average of 36,700 more freight cars out of service because of the need of repairs than during the same months in 1923, it is apparent that it was only because of a speeding up in the handling of freight shipments and a closer co-operation between shippers and railroads that the carriers were able to handle this traffic.

The carriers during the first nine months this year installed 120,727 freight cars of a total of 318,602 since January 1, 1923, while 1,657 locomotives were placed in service during the nine months or 5,674 during the past 21 months.

Carriers Define Position in New Program

The following statement was issued following the annual meeting of the Association of Railway Executives at the Yale Club on Wednesday afternoon.

During the past two years, the railroads of the United States have successfully handled without transportation difficulties the greatest freight traffic ever offered in any similar period of time in history.

By every valid test, railroad operation both in 1923 and 1924 has showed a marked increase in efficiency. To this increase in efficiency, valuable contributions have been made by railroad employes and by co-operation of shippers.

In 1923, capital expenditures for equipment and other improvements amounted to $1,059,149,000 while capital expenditures authorized for 1924 totaled $1,077,297,000, or a total for the two years of $2,136,446,000.

In view of the increased efficiency in operation during both years, and in view of the record breaking traffic handled, it would fairly be presumed that financial returns would appear commensurate with the character and quantity of service. As a matter of fact, however, the railroads of the country again fell far short of realizing the fair rate of return contemplated under the terms of the Transportation Act. The property investments of Class I railroads, including materials and supplies and cash on hand, is $21,725,165,404. At the rate of 5¾ per cent the return realized should have been about $1,250,000,000. In fact, the net railway operating income for Class I carriers in 1923 was $961,955,465 or a return of 4.43 per cent on the property investment. Returns for the year 1924 are not complete but for the first nine months, the return realized has only been 4.21 per cent.

The net railway operating income of Class 1 roads for the calendar year 1916 was $1,040,084,517. Since 1916, new capital to the amount of $3,896,000,000 has been invested in Class 1 roads. The largest net railway operating income of these roads since 1916 was in 1923, when it was less than $962,000,000. From these facts it appears that the Transportation Act has not been responsible for excessive returns, but that, on the contrary, the returns in 1923 were over $78,000,000 less than in 1916, although there has been not only this large addition to capital investment but also a greatly increased service.

The enormous capital expenditures were made by the railroads in full reliance upon the expressed protection in the Transportation Act of the right to a fair return on private property devoted to public transportation service. They have not spared themselves in their efforts to provide ample facilities and adequate service to the shippers and the public. In order to continue to furnish such facilities and such service, adequate revenues are absolutely essential.

The relationship between management and men on the railroads again shows a general record of harmony and co-operation. There have been no serious strikes or serious threats of strike during the year.

A large share of credit for the better co-operation of the shipping public with the carriers is due to the organization of the various shippers' regional advisory boards in all parts of the country. These boards are voluntary organizations and are distinctly representative of the public interest in transportation. Their primary duty is to keep informed of the transportation needs of their respective districts, to discuss and consider with each other and with representatives of the railroads their transportation problems, and to forecast and make known to the railroads the measure of transportation service necessary to meet the future requirements of the shippers.

A lesson to be learned from this forward step is that it has shown the way in respect to the transportation service, to a larger freedom of management and a reduced demand for the exercise governmental authority. It results in improved operating service, by methods voluntarily adopted after conference and a broad knowledge of the situation and carried out by the willing and helpful co-operation of all parties concerned. It removes misunderstandings and puts the public which is served in better harmony with the carriers through a better knowledge of their mutual problems. It is a step away from political regulation and a step toward business treatment.

The shippers of the country have continued to express their complete satisfaction with and appreciation of the transportation service which the railroads have rendered them. Such expressions of satisfaction and commendation have been received from all parts of the country and from shippers dealing in many commodities.

Proof of What Can Be Accomplished

The carriers present to the people of the country this unparalleled record of transportation service during the past two years of more nearly normal business conditions as positive proof of what railroad management can accomplish, even under the strict system of regulation that now exists.

The carriers have asked that the Transportation Act, in its fundamental and cardinal provisions, be left unchanged until such a record could be developed, and they believe that the results set forth above fully justify that request.

While the carriers have refrained from aggressive action in seeking legislation, they have spared no effort to be aggressive in the more fundamental and constructive matter of transportation service. They believe that it is more essentially constructive to offer the people and the shippers of the country a continuously improved transportation service than is anything else that they can do.

Carriers' Position Defined

In the light of this record, therefore, the carriers now define their position as follows:

1. That all railroad problems as they arise should be dealt with and settled as economic questions, which they are, and not as political issues, which they are not.
2. That there is no condition existing today which calls for any urgent legislative action by Congress with respect to the railroads, either as to rates, labor relationship, or valuation.
3. That railroad freight rate and passenger fare adjustments should be left to the duly constituted government regulating body, where they will receive a full and fair hearing and an adequate economic analysis, and not be made the subject of direct legislative action. Rate making by legislative action would be destructive.
4. That amendments to the Transportation Act which may be demonstrated to be necessary by experience under normal business conditions, should be made only after a fair and judicial consideration of all pertinent economic facts, and not as the result of political agitation or of political pressure upon Congress.
5. That a continuation of adequate transportation facilities and service carries as an inevitable corollary the necessity for adequate revenues to be earned and retained in order that railroad credit may be restored and re-established in the confidence of investors and that ample additions, improvements, and repairs may be made at reasonable financial costs.
6. That the carriers should seek in every legitimate way to enlighten the public on all phases of the complex transportation industry by the dissemination of authoritative information and should foster and aid the tendency recently observed to remove railroad questions from the arena of politics to the field of economic analysis so that the private management of the railroads may continue a program of increasingly adequate and efficient service, under full and proper regulation, and may continue the efforts they are making to serve faithfully the public interest.
7. And that, looking forward with continued confidence to the fairness of the American people, the railroads are determined to continue their policy of expansion to provide adequate transportation for the increasing commerce of the country and to strive in every way to bring about greater efficiency in operation and a progressive reduction in cost.

Report on Inspection of Pennsylvania Train Control

WASHINGTON, D. C.

THE Interstate Commerce Commission has made public a letter addressed by E. H. De Grott, Jr., director of the Bureau of Signals and Train Control Devices to Samuel Rea, president of the Pennsylvania, with a copy to G. A. Blackmore, vice-president of the Union Switch & Signal Company, referring to the recent inspection by the commission's engineers of the installation of the Union Switch & Signal Company's three speed continuous inductive system of automatic train control on the Lewistown branch of the Pennsylvania Railroad. This inspection was similar in character to the preliminary inspections of permanent installations under the commission's order authorized in its circular of June 9, 1924. The letter says:

1. It is our understanding that the older pneumatic apparatus with which the majority of the locomotives assigned to this branch are still equipped, is considered obsolete and will be replaced with the later type as rapidly as possible. With this understanding this older type will not be further discussed here.

2. In the later type of pneumatic equipment, as installed on locomotive 4142, diagramatically illustrated by Westinghouse drawing C 41722, the type which it is our understanding you propose to adopt, it was determined that, when employed in combination with the No. 6 ET locomotive brake equipment, it will cut off the main reservoir air supply to the application cylinder of the distributing valve in a manual emergency application made while the automatic apparatus is applying the brake, or while the application valve of the automatic apparatus is in application position. This is at variance with the portion of requirement No. 8 of the specifications and requirements of the Commission's order No. 13413, reading.

"The apparatus shall be so constructed as not to . . . impair the efficiency of the air brake system."

3. It is understood that difficulty has been experienced with this installation as a result of the presence of foreign current. Effective means should be provided to overcome this.

4. The cut-in feature at the beginning of train control territory in this installation is designed and operated upon the open circuit principle, and while the wayside and cab signals are intended to apprise the engineman of a failure of the device to automatically cut-in, this method involves reliance upon the human element.

5. No provision is made in this installation for re-acknowledgement at successive stop signals.

The object of this and similar inspections, as indicated in the first paragraph of this communication is that of constructive criticism; the pointing out of such matters as may be helpful to the carrier in checking an installation against the specifications and requirements of the Commission and such other related points as our necessarily brief inspection may develop. The foregoing criticisms and comments are offered accordingly.

One of a Series of Safety Posters Prepared by the London & North Eastern Railway, Size 25 in. by 40 in., Printed in Two Colors

General News Department

The National Highway Traffic Association, the annual meeting of which is to be held at 12 East 53rd street, New York City, next month, has changed the date from Wednesday, December 3, to Tuesday, December 2.

In the derailment of passenger train No. 29 of the Florida East Coast Railway, at Wabosso, Florida, on the evening of November 14, four passengers were killed and twenty or more were injured. One coach was overturned. The reports say that the derailment was due to failure of a brake beam.

The St. Louis Railway Club held a meeting on November 14 at the Hotel Jefferson, St. Louis, Mo., at which J. G. Blunt, chief mechanical engineer of the American Locomotive Company, Schenectady, N. Y., spoke on the development of the modern steam locomotive, treating especially the recent development of the three-cylinder type locomotive.

A resolution was introduced in the provincial legislature of British Columbia on November 3 designed to authorize that body to sell the Pacific Great Eastern to a prospective buyer who would complete the line from Squamish, B. C., to North Vancouver on the south, and from Quesnel to the Peace River country on the north, in consideration of receiving large grants of land contiguous to the line.

An amusement center, the principal feature of which will be a huge seawater swimming tank surrounded by a promenade, will be constructed by the Canadian Pacific on a site immediately east of its Empress Hotel at Victoria, B. C., at a total cost of $225,000. The contracts for the construction of the amusement center, which will be known as "Crystal Garden," have already been awarded and the work is to be completed by May 15, 1925.

The Portland Cement Association held its annual meeting at the Blackstone hotel, Chicago, on Wednesday, November 19, concluding with a banquet on that evening at which approximately 400 were present. This dinner was made the occasion of the celebration of the one hundredth anniversary of the invention of portland cement. Blaine S. Smith, general sales manager of the Universal Portland Cement Company, Chicago, was elected president of the association for the ensuing year.

A special train run by the Pennsylvania from Chicago to Cleveland, Ohio, a distance of 408 miles, on November 12, when an officer of the National Smelting Company of Cleveland, endeavored to reach his home before the death of his son, who had been struck by an automobile, traversed that distance in 7 hr. 17 min. The train left Chicago at 7:17 p. m., Central Time, arrived at Ft. Wayne at 9:53 p. m., and reached Cleveland at 3:34 a. m., Eastern Time; average speed, 56 miles an hour.

The Illinois Central has entered into a contract with the Commonwealth Edison Company of Chicago whereby the latter will furnish the electric power necessary in the operation of the electrified portion of the Illinois Central within its Chicago terminal district. The Commonwealth Edison Company will erect seven substations along the railway from the Chicago passenger terminal to Matteson and also to South Chicago and Blue Island. It is now planned to complete the electrification of the Chicago terminal for suburban passenger service by the summer of 1926.

Two new branches of the Timiskaming & Northern Ontario were opened on November 10, adding about 40 miles of line to the provincially-owned road. They are the Kirkland lake subdivision and the Lorraine subdivision. These extensions carry railway facilities to two mining fields which have for some time been attracting wide attention. The gold mines and the gold prospects of the Kirkland lake and Larder lake districts have been in need of railway facilities. The recent discoveries in Quebec province are, also, naturally tributary to those districts.

The San Diego & Arizona Railway, operating 156 miles of line, has contracted with the Metropolitan Life Insurance Company for group life insurance for its employees, about 500 in number. All in the service six months have $250 insurance given free by the railway company, and all in the service one year $500; and the contract provides for the usual additional amounts to be paid for by the employees individually. The Jackson & Eastern, headquarters at Meridian, Miss., has made a group insurance contract with the Metropolitan for its 75 employees.

Negro waiters and cooks on railway dining cars have organized a union to be known as the Brotherhood of Dining Car Employees and are seeking recognition by managements of a number of railways. The brotherhood's first appearance before the Railroad Labor Board was made at the hearing of a dispute with the Southern which refused to recognize the new organization as representative of its employees in the dining car service. The Labor Board will order that an election be held on the Southern to determine the wishes of the employees as to their representatives in wage and working rule hearings.

The proposal of the New York, Chicago & St. Louis to dredge a harbor in Lake Calumet, Chicago, in return for the privilege of constructing and operating a belt railroad around the harbor will be opposed by the state of Illinois, according to a notice sent to officials of the city of Chicago. The state also asks that the city express itself as to its willingness to build the harbor so that in the event the municipality is unable to do so, authority may be obtained from the legislature empowering the state of Illinois to do the work. Representatives of the railroads interested in the Calumet harbor plan are to be given an opportunity to discuss the state's proposal or to offer alternative plans.

A combined index of everything of permanent value that has been published in this country on railroad signaling during the last 25 years is now available in the office of the secretary of the Signal Section of the American Railway Association, 30 Vesey street, New York City. It is not to be published, but Secretary H. S. Balliet announces to everybody that inquiries sent to him will receive due attention. The work has been compiled from the indexes of the several annual volumes of proceedings of the Section, which go back to the first year of the original association, The Railway Signaling Club, established at Chicago in 1895. It is not literally true that everything of value in this field was published in these society proceedings; but pretty nearly everything was the subject, sooner or later, of some reference, in committee reports or otherwise, so that this aggregation of indexes will no doubt prove a comprehensive guide. Combined with the "Index to Signal Literature" which was issued from the secretary's office in 1910, the present work will constitute a valuable compendium.

Locomotive Inspection Report

The Interstate Commerce Commission's monthly report to the President on the condition of railway equipment shows that during October 5,898 locomotives were inspected by the Bureau of Locomotive Inspection, of which 2,847 were found defective, or 48 per cent, and 341 were ordered out of service. The Bureau of Safety during the month inspected 104,515 freight cars, of which 4,347 were found defective, and 1,413 passenger cars, of which 23 were found defective. Fourteen cases involving 33 violations of safety appliance acts were transmitted to various United States attorneys during the month for prosecution.

Signal Section Nominees

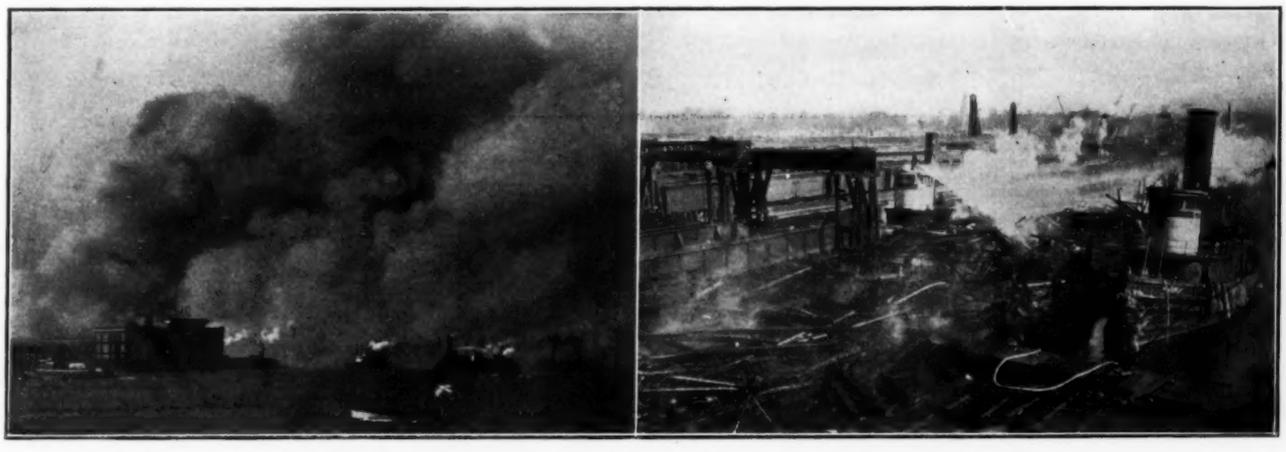
The nominating committee of the Signal Section of the American Railway Association, presents for the next annual meeting the following candidates: for chairman, W. M. Post (Penn.); first vice-chairman, A. H. McKeen (Union Pacific); second vice-chairman, C. H. Tillett (Canadian National). For members of the committee of direction, to serve three years: W. E. Boland (S. P.); G. H. Dryden (B. & O.); G. W. Chappell (N. Y., N. H. & H.).

Southern Freight Rate Investigation

A further hearing in the commission's Southern class rate investigation will be held at Atlanta, Ga., beginning December 15. This hearing will be held for the purpose of introducing into the record the results of the traffic test for the month of April, 1924, which the carriers have made to ascertain the effect upon their revenues of the rates recommended by the proposed report in this proceeding. Following the hearing, opportunity will be afforded for the filing, on or before January 5, 1925, of supplementary briefs dealing with the results of the traffic test. Oral argument in the proceeding has been assigned before the commission at Washington, D. C., for January 14, 15 and 16.

Costly Fire at Jersey City

By a fire which started from some unknown cause on Sunday noon, November 16, piers No. 5 and No. 6 of the Erie Railroad at Jersey City, N. J., adjacent to the passenger trains were destroyed together with 14 barges and great quantities of freight; estimated total loss $1,500,000.



P & A

Left—the Fire in Progress as Seen from the Hudson River. Right—the Smoldering Ruins of One of the Piers

C. P. R. Declines to Build Ottawa Tunnel

Once more the Canadian Pacific has been obliged to inform the city of Ottawa that it cannot at this time entertain the proposal for joint construction with the city of a tunnel from the present Union station westward under the city. Many times such a project has been discussed, and this latest effort for the city was made by Naulon Cauchon, head of the town-planning department, who is working on an elaborate plan to make the municipality of Ottawa a federal district similar in its working to that of Washington.

American Marine Congress Recommends Transportation Cabinet Member

The American Marine Association at its congress in New York on November 12, acting on the conviction that the American merchant marine can best be helped by applying to it the underlying principles of the protective tariff, adopted resolutions calling on the President of the United States to submit to Congress suitable recommendations to insure the permanent maintenance of a sufficient American Merchant Marine, under private ownership and initiative, to carry at least fifty per cent of our sea-borne commerce in the foreign trade; and the association at the same time recommended that there be formed an executive Department of Transportation, with cabinet representation, to include in its functions all forms of marine, land and air transportation, telegraphy, telephony and radio, in so far as the federal government may have jurisdiction.

Canadian Cabinet to Hear Appeals from Railway Board's Decision on Crow's Nest Rates

Premier Mackenzie King announced late last week that the first matter considered at the first full Cabinet meeting on November 13, after his seven weeks' absence in Western Canada, was the national freight rates situation arising out of the Dominion Railway Board's order setting aside the Crow's Nest Pass rates. It was decided at the Cabinet meeting, the Prime Minister stated, that the federal government would on December 4 hear argument in the case of the appeal of the governments of Manitoba, Saskatchewan and Alberta from the Board's order.

Application to the Railway Board from those three provinces for leave to appeal from its order on points of law to the Supreme Court of Canada will be heard by the Board on November 27. It is expected that this argument will be merely formal and that the leave to appeal will be granted, so that the appeals by the Supreme Court and the federal Cabinet will be heard at about the same time.

There is increasing evidence pointing to the freight rates question becoming a vital national issue in Canada and of playing a prominent part in the next federal general election likely to be held within twelve months. Continued agitation in the western provinces for complete restoration of the Crow's Nest Pass Agreement together with reminders from British Columbia and the Maritime provinces that any concessions made to the Prairie provinces will only aggravate the rate situation elsewhere, show how difficult of solution is this problem.

Want Provinces to Finish Hudson Line If Dominion Government Refuses

Requesting the grant of $2,000,000 from the government of Manitoba as a contribution towards the completion of the Hudson Bay Railway a deputation representing the "On-to-the-Bay Association" waited last week in Winnipeg upon Premier John Bracken and other members of the provincial cabinet. The deputation stated that a similar request had been recently made upon the government of Saskatchewan and the proposal had been favorably received. In advancing their request the delegates suggested that in the event of the federal government failing to complete the road a joint arrangement could be entered into by the Manitoba and Saskatchewan governments with a capital fund of $4,000,000 to carry out the undertaking. Premier Bracken and his colleagues, while expressing themselves in sympathy with the need for completing the road, favored continuance of pressure upon the Dominion authorities in preference to acquisition of the road as a provincial undertaking.

Operating Statistics of Large Steam Roads—Selected Items for the Month of September, 1924,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1924 394	243,255	259,141	26,962	4,861	70.6	245,570	97,953	125	19	13.4	...
	1923 394	260,923	278,811	29,237	5,425	71.4	272,702	112,559	112	32	22.4	...
Boston & Maine	1924 2,455	490,876	559,341	55,674	12,224	73.4	600,825	252,116	331	128	27.9	39
	1923 2,455	568,153	624,692	57,415	12,761	73.6	625,653	258,973	353	123	25.8	12
N. Y., New H. & Hartf.	1924 1,953	450,646	474,308	27,728	12,243	72.1	608,669	260,134	304	68	18.2	39
	1923 1,974	490,299	516,585	34,002	11,853	71.1	604,235	260,211	299	76	20.2	8
Great Lakes Region:												
Delaware & Hudson	1924 888	353,817	472,081	41,360	9,397	66.7	592,594	300,978	254	36	12.5	83
	1923 886	329,618	456,549	40,409	8,786	68.5	544,030	275,548	245	60	19.7	60
Del., Lack. & Western	1924 993	555,918	649,024	95,509	17,735	70.8	976,929	438,492	301	62	17.0	43
	1923 993	462,619	548,971	89,476	14,749	72.1	753,703	322,932	290	64	18.0	44
Erie (inc. Chi. & Erie)	1924 2,325	990,091	1,103,756	119,594	38,893	68.8	2,240,776	995,025	659	103	13.5	167
	1923 2,309	1,004,651	1,116,325	102,433	36,759	68.1	2,106,670	918,025	704	121	14.7	163
Lehigh Valley	1924 1,357	587,019	647,097	72,806	18,114	66.8	1,074,736	503,689	481	68	12.4	131
	1923 1,317	515,309	566,163	85,129	14,927	69.9	830,914	386,484	415	135	24.6	54
Michigan Central	1924 1,827	531,327	542,916	22,857	18,155	67.8	962,327	385,169	314	58	15.7	96
	1923 1,827	557,512	574,712	22,048	18,246	68.3	958,911	390,785	333	58	14.7	62
New York Central	1924 6,447	1,948,812	2,160,269	147,457	72,567	65.2	4,274,981	1,896,725	1,251	404	24.4	426
	1923 6,469	2,223,261	2,514,349	188,791	80,408	64.0	4,844,786	2,163,823	1,375	374	21.4	337
New York, Chi. & St. L.	1924 1,669	629,401	638,767	5,329	20,181	70.3	1,072,344	440,989	252	66	20.9	51
	1923 1,669	706,740	716,767	3,320	20,057	70.9	1,052,393	443,777	214	75	25.9	7
Pere Marquette	1924 2,227	375,032	387,159	10,283	9,914	71.5	535,131	257,760	191	24	11.3	37
	1923 2,197	432,969	448,087	7,753	10,612	70.2	598,518	302,649	193	27	12.2	13
Pitts. & Lake Erie	1924 231	108,105	110,684	959	3,763	64.2	284,599	168,450	73	15	17.3	15
	1923 231	167,014	172,553	2,189	5,930	62.2	456,474	267,428	78	13	14.6	4
Wabash	1924 2,459	663,700	698,067	13,966	21,220	72.9	1,122,594	478,276	308	49	13.8	53
	1923 2,418	681,492	717,262	16,210	20,118	72.9	1,054,779	448,069	264	62	19.0	...
Central Eastern Region:												
Baltimore & Ohio	1924 5,207	1,803,252	2,068,150	161,585	53,005	66.7	3,232,097	1,585,119	974	308	24.0	117
	1923 5,212	2,112,382	2,445,645	174,190	58,564	66.0	3,642,687	1,838,923	1,100	187	14.5	86
Central of New Jersey	1924 692	279,120	304,389	35,075	7,091	61.7	450,389	222,437	231	47	17.1	33
	1923 695	252,038	278,446	37,389	6,294	67.7	368,239	180,065	231	48	17.2	30
Chicago & Eastern Ill.	1924 945	241,330	242,767	3,840	6,862	67.8	402,768	203,217	121	34	21.6	45
	1923 945	245,089	247,957	4,989	6,783	66.1	402,259	202,588	131	50	27.4	37
Clev., Cin., Chi. & St. L.	1924 2,380	683,983	729,097	12,063	22,744	65.4	1,413,555	692,248	368	84	18.6	66
	1923 2,377	752,821	786,263	8,470	23,856	64.9	1,506,487	744,778	363	76	17.4	41
Elgin, Joliet & Eastern[1]	1924 460	100,294	107,495	4,397	3,163	65.3	236,844	127,461	86	12	12.4	22
	1923 460	122,866	135,579	7,232	3,778	66.5	281,759	153,465	83	17	16.7	1
Long Island	1924 393	45,905	48,733	7,396	664	61.0	40,005	16,112	44	13	23.2	5
	1923 393	47,680	55,316	8,643	642	61.5	37,277	14,642	39	15	27.2	...
Pennsylvania System	1924 10,942	4,327,396	4,676,733	336,429	127,870	67.1	8,131,910	3,972,239	2,711	836	23.6	321
	1923 10,907	5,002,953	5,460,740	425,775	138,300	65.5	9,190,355	4,632,712	2,932	559	16.0	58
Reading	1924 1,141	617,094	674,417	65,121	15,713	64.6	1,037,051	540,071	425	79	15.7	136
	1923 1,142	637,300	704,835	76,444	16,106	64.2	1,065,192	556,211	345	116	25.2	65
Pocahontas Region:												
Chesapeake & Ohio	1924 2,555	1,043,524	1,122,996	34,079	32,712	58.8	2,502,279	1,379,289	443	97	17.9	6
	1923 2,553	980,704	1,078,905	26,544	29,820	58.9	2,400,503	1,254,078	442	98	18.2	16
Norfolk & Western	1924 2,230	851,109	1,011,000	29,030	25,901	60.4	2,082,694	1,100,071	592	93	13.6	167
	1923 2,228	852,607	1,064,089	36,069	25,051	62.3	1,930,274	1,031,385	578	110	15.9	60
Southern Region:												
Atlantic Coast Line	1924 4,865	629,824	645,129	10,499	15,786	65.9	829,413	344,336	419	52	11.1	112
	1923 4,861	609,707	612,301	9,350	15,476	69.1	793,719	339,464	355	59	14.2	70
Central of Georgia	1924 1,907	293,271	294,467	4,738	6,508	73.1	336,151	150,324	139	18	11.2	15
	1923 1,907	281,082	282,951	5,766	5,973	75.1	304,940	141,781	126	21	14.1	...
Illinois Central (inc. Y. & M. V.)	1924 6,197	1,716,024	1,735,046	37,560	51,681	66.5	3,136,964	1,407,966	771	122	13.7	62
	1923 6,190	1,882,719	1,896,200	38,473	53,920	65.0	3,338,897	1,527,154	705	128	15.4	...
Louisville & Nashville	1924 5,026	1,640,225	1,741,430	64,049	31,966	62.5	2,108,190	1,035,240	612	117	16.1	46
	1923 5,032	1,682,188	1,786,971	68,161	31,129	63.4	2,018,223	995,435	611	87	12.5	...
Seaboard Air Line	1924 3,547	434,365	451,251	4,677	10,372	69.0	545,290	229,037	210	45	17.6	15
	1923 3,553	436,143	448,434	8,631	10,093	71.7	524,259	228,943	214	30	12.3	6
Southern Railway	1924 6,840	1,348,186	1,378,864	32,576	31,745	71.0	1,671,813	704,376	873	119	12.0	45
	1923 6,942	1,436,181	1,487,130	32,406	33,521	71.6	1,749,436	783,752	833	100	10.7	...
Northwestern Region:												
Chi. & North Western	1924 8,463	1,722,988	1,791,705	36,907	42,330	65.4	2,434,257	974,129	808	249	23.6	83
	1923 8,463	1,712,090	1,804,939	23,847	40,486	64.9	2,315,993	904,011	888	170	16.1	37
Chi., Milw. & St. P.	1924 10,983	1,707,113	1,792,448	76,228	48,860	65.2	2,844,568	1,284,616	970	160	14.1	114
	1923 11,007	1,822,695	1,877,967	73,359	48,300	66.5	2,695,393	1,213,835	918	166	15.3	85
Chi., St. P., Minneap. & Om.	1924 1,726	382,786	412,403	16,614	7,662	75.8	415,555	193,163	165	40	19.3	6
	1923 1,726	343,298	370,515	16,658	6,901	67.3	375,563	155,100	161	44	21.3	11
Great Northern	1924 8,251	1,165,907	1,191,380	53,330	35,450	58.5	2,312,727	1,070,048	630	142	18.4	41
	1923 8,252	1,147,198	1,182,142	51,233	34,893	61.6	2,209,221	1,075,677	598	131	18.0	55
Minn., St. P. & S. Ste. M.	1924 4,374	646,269	659,884	7,728	15,813	68.8	867,501	419,717	300	43	12.5	4
	1923 4,374	606,264	615,627	9,827	14,977	70.3	793,736	386,420	292	51	14.8	1
Northern Pacific	1924 6,447	973,586	1,015,579	50,210	29,304	67.6	1,707,177	777,431	578	135	19.0	87
	1923 6,415	1,082,650	1,130,425	65,664	31,849	65.2	1,878,315	829,535	593	133	18.3	36
Oreg.-Wash. R. R. & Nav.	1924 2,183	214,525	230,406	21,578	5,999	72.5	337,412	158,299	146	25	14.4	15
	1923 2,188	257,717	275,785	32,328	6,811	71.0	396,862	191,602	154	23	13.0	6
Central Western Region:												
Atch., Top. & S. Fe	1924 9,979	2,065,598	2,282,837	172,886	67,356	65.2	3,931,339	1,366,155	856	159	15.7	106
	1923 9,905	1,942,618	2,101,481	134,710	60,093	66.3	3,396,688	1,170,856	786	183	18.9	53
Chicago & Alton	1924 1,022	341,805	347,834	3,809	8,311	63.9	492,561	215,123	123	28	18.6	19
	1923 1,910	357,640	364,488	6,039	9,011	66.0	530,724	230,821	122	36	22.6	7
Chi., Burl. & Quincy	1924 9,346	1,715,183	1,788,554	80,177	49,284	61.7	2,980,838	1,357,074	813	201	19.8	40
	1923 9,338	1,785,818	1,855,031	84,131	49,753	63.4	2,926,014	1,333,971	798	194	19.6	25
Chi., Rock I. & Pacific	1924 7,595	1,374,374	1,412,205	14,924	35,502	72.3	1,881,906	848,987	592	182	23.5	63
	1923 7,635	1,385,034	1,416,678	24,547	32,622	70.4	1,738,219	763,698	520	215	29.2	11
Denver & R. G. Western	1924 2,610	355,738	437,595	84,402	8,674	67.8	490,870	210,661	261	59	18.4	17
	1923 2,593	354,060	437,812	80,203	7,308	63.8	441,095	192,654	241	92	27.5	2
Oregon Short Line	1924 2,383	388,679	405,837	24,326	9,883	67.3	564,979	242,060	203	27	11.6	53
	1923 2,367	479,268	503,303	29,916	11,276	65.9	672,847	282,982	193	35	15.2	12
Southern Pacific (Pacific System)	1924 7,009	1,475,969	1,640,138	303,691	45,591	66.6	2,665,061	1,046,359	702	182	20.6	43
	1923 6,939	1,525,086	1,712,413	368,576	44,519	68.7	2,537,267	1,023,841	661	129	16.3	6
Union Pacific	1924 3,732	1,489,555	1,508,528	73,809	49,471	67.9	2,713,856	995,011	493	57	10.3	113
	1923 3,709	1,633,672	1,681,892	136,092	48,565	70.5	2,598,989	954,095	486	61	11.1	61
Southwestern Region:												
Gulf, Colo. & Santa Fe	1924 1,897	313,044	332,945	7,393	9,678	66.7	567,350	259,466	122	20	13.8	4
	1923 1,897	277,077	284,326	5,225	7,364	66.8	416,147	180,458	115	28	19.7	5
Mo.-Kans.-Tex.	1924 1,787	262,873	266,347	4,515	9,261	63.2	521,486	208,449	146	29	16.4	65
	1923 1,801	280,680	281,234	7,446	8,487	63.3	469,995	187,847	147	68	31.7	56
Mo.-Kans.-Tex. of Tex.	1924 1,389	209,804	217,544	6,518	5,758	64.4	318,490	127,614	109	16	12.4	31
	1923 1,389	199,513	204,338	3,631	4,904	66.9	263,509	106,106	78	49	38.7	5
Missouri Pacific	1924 7,302	1,488,340	1,520,804	47,394	38,553	66.0	2,262,687	995,967	512	118	18.7	...
	1923 7,305	1,282,730	1,295,347	45,591	32,755	68.3	1,845,341	817,930	451	185	29.1	...
St. Louis-San Francisco	1924 4,683	853,356	870,773	18,286	19,169	67.0	1,073,801	461,287	417	80	16.2	45
	1923 4,683	896,565	911,491	16,858	18,057	67.7	1,008,071	450,139	378	125	24.8	16
Southern Pacific Lines (in Tex. and La.)[2]	1924 3,710	634,749	636,734	5,841	15,387	67.8	886,436	383,214	228	58	20.3	34
	1923 3,710	648,120	649,767	4,422	14,265	66.6	838,152	356,969	234	66	22.1	27
Texas & Pacific	1924 1,953	289,338	289,338	968	7,527	69.5	410,622	171,953	158	36	18.3	24
	1923 1,953	262,379	262,379	4,920	6,484	67.9	347,883	141,897	158	42	21.2	38

[1]No passenger-train service. [2]Includes Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with September, 1923, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany	1924 **2,463**	**5,314**	**7,777**	4.0	....	1,010	403	20.2	420	29.5	8,289	189	66.0
	1923 1,984	6,235	8,219	4.0	....	1,045	431	**20.7**	456	30.8	9,524	193	71.1
Boston & Maine	1924 14,256	15,061	29,317	11.8	....	1,224	514	20.6	287	18.9	3,423	136	44.6
	1923 13,504	17,135	30,639	11.6	....	1,101	456	20.3	282	18.9	3,516	156	47.7
N. Y., New H. & Hartf.	1924 20,772	17,125	37,897	21.9	544	1,351	577	21.2	229	14.9	4,439	137	**45.0**
	1923 **19,917**	**16,717**	**36,634**	**20.8**	....	1,232	531	22.0	237	15.2	4,394	155	**49.0**
Great Lakes Region:													
Delaware & Hudson	1924 9,082	5,743	14,825	7.7	....	**1,675**	**851**	**32.0**	**677**	**31.7**	**11,298**	175	59.0
	1923 9,383	8,372	17,755	5.6	1,550	1,650	836	31.4	517	**24.1**	**10,363**	192	54.3
Del., Lack. & Western	1924 15,847	8,951	24,798	4.0	11	1,757	789	24.7	589	33.7	14,726	156	68.5
	1923 13,705	11,247	24,952	4.0	....	1,629	698	21.9	431	27.3	10,840	176	60.2
Erie (inc. Chi. & Erie)	1924 34,001	21,573	55,574	6.7	**7,451**	**2,263**	1,005	25.6	597	33.9	14,267	123	53.5
	1923 24,065	26,442	50,507	7.8	....	2,097	914	25.0	606	35.6	**13,250**	126	49.2
Lehigh Valley	1924 21,309	9,931	31,240	6.9	308	1,831	858	27.8	537	28.9	12,377	145	43.7
	1923 20,272	11,942	32,214	5.2	1,856	1,612	750	25.9	400	22.1	9,783	168	39.4
Michigan Central	1924 12,083	16,174	28,257	5.5	130	1,811	725	21.2	454	31.6	7,029	118	50.7
	1923 9,711	19,640	29,351	5.3	....	1,720	701	21.4	444	30.3	7,131	124	50.9
New York Central	1924 65,910	67,442	133,352	4.4	14,904	2,194	973	26.1	474	27.8	9,807	117	46.5
	1923 52,995	90,036	143,031	6.3	**1,330**	2,179	973	26.9	504	29.3	11,151	118	51.5
New York, Chi. & St. L.	1924 9,041	12,030	21,071	6.3	....	1,704	701	21.9	698	45.4	8,809	116	67.6
	1923 **6,664**	**14,943**	**21,607**	**8.4**	....	1,480	628	22.1	685	43.7	8,860	128	83.2
Pere Marquette	1924 8,487	11,896	20,383	7.4	....	**1,427**	**687**	**26.0**	**422**	**22.8**	3,858	120	61.6
	1923 6,889	19,586	26,475	3.5	....	1,382	699	28.5	381	19.0	4,591	132	69.2
Pitts. & Lake Erie	1924 14,787	7,568	22,355	4.3	1,727	2,633	1,558	44.8	251	8.7	24,259	67	42.4
	1923 8,254	13,255	21,509	9.4	....	2,733	1,601	45.1	414	14.8	38,555	73	63.5
Wabash	1924 **11,874**	**10,480**	**22,354**	**3.8**	....	1,691	721	22.5	713	43.4	6,483	130	66.5
	1923 9,533	14,052	23,585	**2.6**	....	1,548	657	22.3	633	39.0	6,177	141	**75.0**
Central Eastern Region:													
Baltimore & Ohio	1924 69,869	38,803	108,672	15.5	2,716	**1,792**	**879**	**29.9**	**486**	**24.4**	10,148	165	**58.0**
	1923 55,529	48,237	103,766	4.2	....	1,724	871	31.4	591	28.5	11,761	176	**67.9**
Central of New Jersey	1924 17,501	10,491	27,992	5.0	2,628	**1,614**	**797**	**31.4**	**265**	**13.7**	10,715	173	**40.7**
	1923 13,269	13,214	26,483	11.3	....	1,461	714	28.6	227	11.7	8,641	189	37.7
Chicago & Eastern Ill.	1924 14,043	**4,596**	**18,639**	**21.0**	**879**	1,669	842	29.6	361	18.0	7,167	141	53.1
	1923 11,479	5,424	16,903	15.4	....	1,641	827	29.9	398	20.1	7,145	167	46.6
Clev., Cin., Chi. & St. L.	1924 14,259	21,390	35,649	5.6	1,665	2,067	1,012	30.4	647	32.5	9,695	118	54.7
	1923 11,990	23,888	35,877	7.9	....	2,001	989	31.2	692	**34.2**	10,446	119	**60.3**
Elgin, Joliet & Eastern[1]	1924 9,619	6,259	15,878	8.0	1,217	2,361	1,271	40.3	268	10.2	9,241	124	38.1
	1923 **8,947**	**7,817**	**16,764**	**8.0**	....	2,293	1,249	40.6	305	11.3	11,127	116	48.1
Long Island	1924 **1,771**	**4,788**	**6,559**	**0.9**	**68**	871	351	24.3	82	5.5	1,366	262	32.8
	1923 1,492	5,845	7,337	1.5	....	**782**	**307**	**22.8**	**67**	**4.7**	1,241	339	**40.0**
Pennsylvania System	1924 199,508	96,197	295,705	10.3	20,111	1,879	918	31.1	448	21.5	12,101	132	47.1
	1923 169,134	117,776	286,910	4.4	**2,293**	1,837	**926**	**33.5**	538	24.5	14,159	144	56.2
Reading	1924 22,864	14,116	36,980	2.8	**4,146**	1,681	875	34.4	487	21.9	15,783	164	49.0
	1923 16,698	**19,427**	36,125	**3.9**	....	1,671	873	34.5	513	23.1	16,241	171	56.5
Pocahontas Region:													
Chesapeake & Ohio	1924 25,355	13,577	38,932	6.0	**834**	**2,398**	**1,322**	42.2	**1,181**	**47.6**	17,995	111	71.4
	1923 **25,563**	**14,652**	**40,215**	**6.7**	....	2,448	1,279	42.1	1,040	41.9	16,375	114	68.1
Norfolk & Western	1924 **28,940**	**10,272**	**39,212**	**5.7**	**1,684**	**2,447**	**1,293**	**42.5**	935	**36.4**	**16,443**	153	50.6
	1923 25,951	11,848	37,799	5.0	....	2,264	1,210	41.2	909	35.4	15,428	181	53.4
Southern Region:													
Atlantic Coast Line	1924 20,126	9,839	29,965	5.0	....	1,317	547	21.8	383	26.6	**2,359**	123	46.4
	1923 15,154	10,908	26,062	5.7	....	1,302	557	21.9	434	28.6	2,328	122	50.1
Central of Georgia	1924 **4,169**	**4,965**	**9,134**	**7.6**	....	1,146	513	23.1	549	32.5	2,628	**147**	63.5
	1923 **2,642**	**4,718**	**7,360**	**5.6**	....	1,085	504	23.7	642	**36.0**	2,479	152	65.5
Illinois Central (inc. Y. & M. V.)	1924 **40,424**	**25,040**	**65,464**	**7.1**	....	1,828	820	27.2	717	**39.6**	**7,573**	124	66.2
	1923 33,856	33,752	67,608	5.6	**2,540**	1,773	811	28.3	753	40.9	8,224	131	77.4
Louisville & Nashville	1924 **40,694**	19,022	59,716	15.3	105	**1,285**	**631**	**32.4**	**577**	**28.5**	**6,866**	**156**	**82.6**
	1923 31,743	19,841	51,584	**11.5**	**54**	1,200	592	32.0	643	31.7	6,594	168	88.6
Seaboard Air Line	1924 **9,824**	**6,879**	**16,703**	**6.3**	....	**1,255**	**527**	**22.1**	**457**	**29.9**	**2,153**	**146**	**59.7**
	1923 8,379	9,602	17,981	17.2	....	1,202	525	22.7	424	26.1	2,148	153	62.4
Southern Railway	1924 **38,225**	**21,261**	**59,486**	**5.4**	....	**1,240**	**522**	**22.2**	**395**	**25.0**	**3,433**	**171**	**47.4**
	1923 **29,843**	**28,451**	**58,294**	**4.2**	....	1,218	546	23.4	448	**26.8**	**3,763**	**186**	54.3
Northwestern Region:													
Chi. & North Western	1924 **47,099**	**34,951**	**82,050**	**10.4**	....	**1,413**	**565**	**23.0**	**395**	**26.2**	**3,837**	**137**	**57.7**
	1923 **43,205**	**35,915**	**79,120**	**7.5**	....	1,353	**528**	**22.3**	**381**	**26.3**	**3,561**	**152**	**57.6**
Chi., Milw. & St. P.	1924 **53,397**	**29,895**	**83,292**	**7.7**	....	**1,666**	**753**	**26.3**	**514**	**30.0**	**3,899**	**138**	**55.2**
	1923 **50,596**	**34,157**	**84,753**	**8.1**	....	**1,479**	**656**	**25.1**	**477**	**28.6**	**3,676**	**145**	**60.0**
Chi., St. P., Minneap. & Om.	1924 **3,844**	**11,726**	**15,570**	**8.9**	**1,596**	1,086	505	25.2	413	21.6	3,730	141	**69.6**
	1923 3,566	**10,260**	13,826	9.4	**1,729**	**1,094**	**452**	**22.5**	**374**	**24.7**	**2,995**	**150**	**63.2**
Great Northern	1924 **49,938**	**18,063**	**68,001**	**5.9**	....	**1,984**	**918**	**30.2**	**521**	**29.5**	**4,323**	**126**	**53.7**
	1923 **49,846**	**15,945**	**65,791**	**6.6**	....	**1,926**	**938**	**30.8**	**545**	**28.7**	**4,345**	**123**	**56.4**
Minn., St. P. & S. Ste. M.	1924 **21,179**	**7,707**	**28,886**	**6.2**	**3,438**	**1,342**	**649**	**26.5**	**484**	**26.5**	**3,199**	**105**	**64.9**
	1923 19,364	**8,790**	28,154	6.9	**2,138**	**1,309**	**637**	**25.8**	**458**	**25.2**	**2,945**	**112**	**60.8**
Northern Pacific	1924 **35,570**	**12,075**	**47,645**	**6.4**	**591**	**1,753**	**799**	**26.5**	**543**	**30.3**	**4,020**	**115**	**49.8**
	1923 32,692	**14,532**	**47,224**	**7.3**	**1,311**	**1,735**	**766**	**26.0**	**586**	**34.5**	**4,319**	**118**	**55.0**
Oreg.-Wash. R. R. & Nav.	1924 **5,897**	**4,893**	**10,790**	**3.9**	....	**1,573**	**738**	**26.4**	**489**	**25.5**	**2,417**	**175**	**49.3**
	1923 **5,970**	**7,776**	**13,746**	**3.7**	....	**1,540**	**743**	**28.1**	**465**	**23.3**	**2,919**	**195**	**57.9**
Central Western Region:													
Atch., Top. & S. Fe	1924 **49,945**	**18,752**	**68,697**	**7.2**	**3,442**	**1,903**	**661**	**20.3**	**663**	**50.1**	**4,563**	**117**	**80.6**
	1923 46,929	**19,508**	**66,437**	**6.5**	**5,388**	**1,749**	**603**	**19.5**	**587**	**45.5**	**3,940**	**134**	**77.0**
Chicago & Alton	1924 **9,047**	**6,056**	**15,103**	**4.2**	....	**1,441**	**629**	**25.9**	**473**	**28.6**	**7,017**	**144**	**77.9**
	1923 **7,261**	**8,419**	**15,680**	**7.2**	....	**1,484**	**645**	**25.6**	**491**	**29.0**	**7,616**	**141**	**78.5**
Chi., Burl. & Quincy	1924 **48,580**	**24,097**	**72,677**	**8.1**	**566**	**1,738**	**791**	**27.5**	**621**	**36.6**	**4,840**	**147**	**61.5**
	1923 **44,740**	**28,874**	**73,614**	**4.4**	**1,591**	**1,638**	**747**	**26.8**	**603**	**35.4**	**4,762**	**161**	**65.2**
Chi., Rock I. & Pacific	1924 **31,398**	**25,432**	**56,830**	**10.4**	**4,241**	**1,369**	**618**	**23.9**	**489**	**28.4**	**3,726**	**150**	**61.5**
	1923 **28,521**	**28,007**	**56,528**	**7.9**	**4,540**	**1,255**	**551**	**23.4**	**450**	**27.3**	**3,334**	**166**	**65.4**
Denver & R. G. Western	1924 **13,076**	**5,835**	**18,911**	**7.0**	**3,704**	**1,380**	**592**	**24.3**	**371**	**22.5**	**2,691**	**214**	**54.3**
	1923 **12,506**	**6,574**	**19,080**	**4.6**	**3,192**	**1,246**	**544**	**26.4**	**337**	**20.0**	**2,476**	**234**	**51.9**
Oregon Short Line	1924 **6,748**	**5,331**	**12,079**	**7.0**	....	**1,454**	**623**	**24.5**	**668**	**40.5**	**3,385**	**139**	**62.5**
	1923 **7,900**	**6,390**	**14,290**	**6.3**	....	**1,404**	**590**	**25.1**	**660**	**39.9**	**3,985**	**142**	**78.1**
Southern Pacific (Pacific System)	1924 **24,945**	**31,151**	**56,096**	**6.4**	**5,845**	**1,805**	**709**	**22.9**	**620**	**40.6**	**4,975**	**130**	**73.3**
	1923 **20,340**	**30,534**	**50,874**	**4.0**	**1,484**	**1,664**	**671**	**23.0**	**670**	**42.3**	**4,918**	**142**	**87.8**
Union Pacific	1924 **19,093**	**12,229**	**31,322**	**8.7**	....	**1,822**	**668**	**20.1**	**1,059**	**77.5**	**8,887**	**132**	**95.9**
	1923 **20,433**	**13,617**	**34,050**	**5.4**	....	**1,591**	**584**	**19.6**	**934**	**67.4**	**8,576**	**150**	**110.9**
Southwestern Region:													
Gulf, Colo. & Santa Fe	1924 **9,099**	**5,323**	**14,422**	**3.9**	**238**	**1,812**	**829**	**26.8**	**600**	**33.6**	**4,559**	**106**	**80.2**
	1923 **5,970**	**5,730**	**11,700**	**4.5**	**323**	**1,502**	**651**	**24.5**	**514**	**31.4**	**3,171**	**128**	**67.5**
Mo.-Kans.-Tex.	1924 **10,419**	**6,250**	**16,669**	**4.0**	**1,574**	**1,984**	**793**	**22.5**	**414**	**29.0**	**3,888**	**99**	**51.6**
	1923 **9,896**	**7,542**	**17,438**	**6.1**	**1,058**	**1,674**	**669**	**22.1**	**359**	**25.6**	**3,477**	**116**	**44.7**
Mo.-Kans.-Tex. of Tex.	1924 **299**	**11,551**	**11,850**	**12.3**	**1,053**	**1,518**	**608**	**22.2**	**344**	**24.3**	**3,062**	**113**	**60.0**
	1923 **341**	**10,176**	**10,517**	**15.1**	....	**1,321**	**532**	**21.6**	**336**	**23.2**	**2,546**	**130**	**54.3**
Missouri Pacific	1924 **25,616**	**25,275**	**50,891**	**8.6**	....	**1,520**	**669**	**25.8**	**652**	**38.3**	**4,547**	**137**	**83.0**
	1923 **21,792**	**27,150**	**48,942**	**8.5**	....	**1,439**	**638**	**25.0**	**557**	**32.7**	**3,732**	**145**	**70.3**
St. Louis-San Francisco	1924 **18,684**	**12,539**	**31,223**	**5.2**	**776**	**1,258**	**541**	**24.1**	**492**	**30.5**	**3,283**	**156**	**59.5**
	1923 **19,220**	**14,937**	**34,157**	**6.4**	....	**1,124**	**502**	**24.9**	**439**	**26.0**	**3,204**	**173**	**61.6**
Southern Pacific Lines (in Tex. and La.)[2]	1924 **8,682**	**16,712**	**25,394**	**6.6**	**1,778**	**1,397**	**604**	**24.9**	**502**	**29.7**	**3,443**	**115**	**75.0**
	1923 **6,008**	**15,712**	**21,720**	**4.0**	....	**1,293**	**551**	**25.0**	**548**	**32.9**	**3,207**	**118**	**72.7**
Texas & Pacific	1924 **5,542**	**7,014**	**12,556**	**10.7**	....	**1,419**	**594**	**22.8**	**456**	**28.8**	**2,935**	**129**	**49.9**
	1923 **3,787**	**7,583**	**11,370**	**8.0**	....	**1,326**	**541**	**21.9**	**416**	**28.0**	**2,422**	**131**	**44.5**

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Memorial Tablet to Phineas Davis

On November 27, Thanksgiving Day, the Engineering Society of York, Pa., will unveil a memorial tablet to Phineas Davis, bearing the inscription:

"Phineas Davis, born 1795, died 1835. Mechanical engineer, designer and builder of the first successful coal-burning locomotive. A tribute from the Engineering Society of York, Pa., assisted by the Baltimore & Ohio and citizens of York."

Mr. Davis solved the traction problems for the Baltimore & Ohio, which was chartered in 1827. He is given recognition in the history of the railroad written by J. Snowden Bell. The present officers of the road, including President Willard, state that credit is entirely due him for designing locomotives which could be used to pull heavy trains over grades such as were required to cross the Allegheny mountains. One of the four trial or demonstration locomotives built by Mr. Davis is preserved at York, and plans are being made to have it operated under its own steam. A tablet will also be unveiled by one of the volunteer fire companies at York.

Mr. Davis has been buried in an unmarked grave. No recognition of any kind, except that in Mr. Bell's history and in the records of the Baltimore & Ohio, has been given him prior to this time.

Legal Difficulties in C. N. R. Branch Line Construction

A curious mix-up has developed over the proposed construction of the so-called Turtleford branch line of the Canadian National Railways in Saskatchewan. Careful consideration is being given to the matter by the Dominion Cabinet and messages are being exchanged between George P. Graham, Minister of Railways and Canals at Ottawa, and Premier Charles A. Dunning of Saskatchewan. This Turtleford line was a proposal included in the branch program of the Canadian National submitted to Parliament last session by Mr. Graham. This particular bill passed the House but was killed in the Senate. It was in a different position from that of other lines in that there was $1,200,000 of proceeds available from a provincial bond guarantee of Saskatchewan. Recently an arrangement was concluded between the Saskatchewan government and Sir Henry Thornton, president of the Canadian National, whereby construction of the line should be proceeded with, or at least 23 miles of the whole mileage of 102. A difficulty has arisen, however, from the fact that the provincial guarantee limits the outlay to $15,000 a mile, whereas the cost will be considerably in excess of that amount. Parliament must vote the money but has refused to do so although over and above the amount legally available from the Saskatchewan guarantee only $52,000 is required.

Hearings Ended on Equalization of Westbound Canadian Grain Rates

Hearing by the Dominion Railway Board of the application of British Columbia interests for an equalization of westbound with eastbound grain rates and that the domestic grain rates be lowered to the export rate level was adjourned in Vancouver late last week. Chairman H. A. McKeown expressed displeasure over the failure of the railways to get their argument before the Board there verbally and ruled that they would have until December 1 to file written arguments. Immediately these are received by the Board it will take into consideration all the evidence and arguments and come to a conclusion at an early date.

G. G. McGeer, appearing for the British Columbia interests, declared at the final sitting that George Stephen, assistant freight traffic manager of the Canadian Pacific, had admitted operating and construction costs have no bearing upon railway rates, and Mr. McGeer pressed for an immediate decision. He demanded that the board, with the failure of the railways to submit verbal argument, should rule that British Columbia was entitled to win by default, and that if any adjournment be made it should be on the terms that grain rates to Vancouver be equalized with those eastbound and that the domestic rates be lowered to the export grain rate level.

"I have heard nothing to convince me that the burden should not be equalized," said Chairman McKeown at a civic luncheon tendered to him and Commissioner Frank Oliver. "We are going to try to find the solution, and if we can find the light in our research we will have no hesitation in applying it. If we think the thing is right, then we are going ahead to do it. We are not going to cripple one locality to the benefit of another. There is a solution consistent with the rapid advancement of transportation facilities, with the welfare of those who have stock in our railways, and with the welfare of each section of the Dominion."

Government Contends Tentative Valuations Not Reviewable

The government has filed its brief in the United States Supreme Court in the appeal from the decision of the district court for the Southern district of New York in the case in which the Delaware & Hudson, the Albany & Susquehanna and the Rensselaer & Saratoga are attacking the tentative valuation made by the Interstate Commerce Commission of their property.

The decree of the district court sustained a motion to dismiss the petition on the ground "that there is no equity in this application to suppress a merely preliminary step in a lawful valuation proceeding."

The government brief avers that if this tentative valuation is struck down, "it follows that carriers may do so ad infinitum until all of the tentative valuations have become the subject of equity proceedings in the district courts of the United States, and the valuation of the steam railway transportation system would thus be transferred from the commission to the courts."

The government brief further avers that "if the petition is sustained and the judicial review of the tentative valuation is allowed, then the express provisions for judicial proceedings in the valuation act become submerged. . . . If the 'tentative valuation' declared by the commission is justifiable within the meaning of the commerce court act, then the jurisdiction of the district court is exclusive. The provisions of the commerce court act and those of the valuation act for judicial review may not stand together; one or the other must fall. Congress did not intend any such conflict."

The brief concluded that "the tentative valuation declared by the commission is clearly not reviewable in the manner here undertaken and for that reason the decree of the district court sustaining the motions and dismissing the bill should be affirmed."

The brief is signed by Solicitor General Beck and Assistant to the Solicitor General, Blackburn Esterline.

Report on Tonawanda Collision

The Interstate Commerce Commission has issued a report, signed by W. P. Borland, director of the Bureau of Safety, on the rear collision of passenger trains on the International (electric) Railway near Tonawanda, N. Y., on Sunday, October 19, when four passengers were killed and 96 passengers and 2 employees were injured. A southbound electric train of three cars was detained at Ellicott Creek road by a defect in the trolley pole; and, after having been at rest for from two to five minutes, was run into by a following electric train of three cars which had been moving at about 60 miles an hour. The claim is that the speed of this train was reduced at the moment of collision to about 20 miles an hour. The collision resulted in the wrecking of two cars. The man on the rear car of the standing train had started back with his flag but apparently he did not get more than about 300 ft. The motorman of the second train is held at fault for not maintaining a proper look out. The superstructure of a bridge obstructed his view, but he approached on a curve, and if he had been properly observant when 1,500 ft. back he would have seen the standing train and could have determined on which track it was standing. The testimony about flagging was somewhat contradictory, but the report says that it could not be definitely stated that there was negligence on the part of the leading train. The only rule for the spacing of trains is that they should keep one mile apart (or five minutes apart in a fog or storm), and must be prepared to stop at stations. It appears that many extra trains had been run on October 19 and several southbound trains were following one another from Niagara Falls at intervals of about ten minutes. There are 35 regular trains in each direction on Sundays and the report says that, "under such conditions it is a matter of imperative necessity that in case of delay every man shall do his full duty, and do it quickly"; and that the volume of traffic warrants the installation of a block signal system. The motorman had said that he was not drowsy; but he had been on duty more than 16 hours out of 22 hours and his intervals of rest in this time had been short.

He had had very little sleep for about 27 hours. The officers of the railway are held guilty of violating the spirit and intent of the federal hours of service law.

New Haven's New Pullmans for Merchants Limited

A decorative scheme designed to make the interior of a railroad car as bright and pleasant as a living room in one of the finer homes has been adopted in the designing of new equipment placed in service on Thursday on the Merchants Limited of the New York, New Haven & Hartford, the extra fare train between Boston and New York, leaving at 5 p. m. The trimmings of the cars are done in cream colored enamel, while the revolving chairs, which are of an entirely new design, have been upholstered with a lighter shade of fabric than is ordinarily used in Pullman cars, to harmonize with the general scheme. The window curtains, which are silk faced, and the carpets, are also of materials in harmony with the whole.

Twelve of the new cars have been received from the Pullman Company. They are described as representing the last word in travel comfort. The chairs have been arranged so that each chair is opposite a separate window. Other features are a new decorative grill over the steam pipes, an improved ventilating system, and a newly designed ladies' retiring room which is distinctly more commodious as well as affording greater privacy.

U. S. Chamber of Commerce Opposes Howell-Barkley Bill

The changes in the Transportation Act proposed by the Howell-Barkley bill would be a long step backward, according to a statement representing the position of the Chamber of Commerce of the United States on important current national economic questions submitted to President Coolidge by the officers of the chamber. On this subject the statement said:

"The chamber early recognized the paramount interest of the public in the settlement of railroad labor disputes and, prior to passage of the Transportation Act of 1920, formulated principles which it believed should be followed in such settlements. It did not go so far as to advocate power in the government to enforce decisions, but maintained that the public should have the decisive voice, and that thorough investigation of issues would so inform the public as to the rights in any controversy that a public opinion would crystallize which would make it impossible for the party in the wrong to continue its opposition over any considerable length of time. These principles were realized in the Railroad Labor Board which has now been functioning for more than four years to the great advantage of the public. In this board the public, represented by three members appointed by the President, has the paramount voice, both because the representatives of the railroads and of the employees find themselves opposed to each other on all major issues and because of the provision in the law requiring that at least one public representative must concur in the findings in any wage dispute.

"This plan, and the fundamental principle of the paramount interest of the public, is threatened by the Howell-Barkley bill which was before the House at the last session and was reported in an amended form by the Senate committee.

"The bill is based on the opposition of railroad employees and their organizations to the Railroad Labor Board and seeks to turn the clock backwards to the resumption of the former and weaker principles of mediation and conciliation.

"While there are provisions in the bill, particularly as amended by the Senate committee, providing a certain degree of public representation, it is by no means on a par with the existing provisions of law. The bodies which it provides with public representation and the power of fact finding need not be resorted to by the parties. It gives no public body the authority, contained in the present law, to suspend and review any decision arrived at by agreement between the parties if such decision is likely to necessitate a substantial increase in railway rates. It contains other objectionable features.

"Without assuming to pretend that the present construction or composition of the Railway Labor Board is in all respects perfect, the chamber finds that the principles are sound; that the record of the past four years has justified those principles; and that the changes proposed in connection with the Howell-Barkley bill not only do not offer any prospect of improvement over the existing system; but would be a long step backwards."

Traffic News

The Los Angeles passenger terminal used jointly by the Union Pacific and the Southern Pacific has been named the Central Passenger Station.

J. E. Harris, traffic manager of the Jeffrey Manufacturing Company, Columbus, Ohio, has been appointed acting president of the Ohio State Industrial Traffic League to succeed F. M. Renshaw, who resigned to take charge of the traffic department of the Buffalo Chamber of Commerce.

William H. Day has been appointed manager of the traffic department of the Boston Chamber of Commerce, in place of W. H. Chandler, who resigned recently to go to the Merchants' Association of New York. Mr. Day has for 14 years past been traffic manager of the Lynn (Mass.) Chamber of Commerce.

C. T. Bradford, manager of the traffic department of the International Harvester Company, was elected president of the Chicago Shippers' Conference Association at a meeting at the Hotel LaSalle on November 4. Other officers elected were W. J. M. Lahl, traffic manager of the American Seating Company, secretary; R. W. Campbell, manager of the traffic division of the Butler Paper Corporation, treasurer; George A. Blair, general traffic manager, Wilson & Co. and R. H. Drake, division freight agent of the American Can Company, directors.

The number of automobiles now in use in New England as common carriers of passengers is about 450, according to a recent article in the Boston Transcript, in which it is estimated that nearly 100 bus lines are in operation. The total does not include sight-seeing buses or those used exclusively by tourists. Daily service is carried on between Portland, Maine, and Boston; Boston and New York; Boston and Albany; Boston and Providence and from Boston to Manchester, N. H. Between Boston and Providence there are two buses operating, making nine trips a day. The Boston Elevated, which operates a large mileage of surface street car lines as well as elevated and subway railroads, operates 63 buses, adjuncts to the street car lines. The Eastern Massachusetts Street Railway has 41 buses in use, scattered all over its railway system. Other street railway companies operate buses to the estimated number of 90.

Shippers Oppose Class Rate Revision

Shippers in the Central Freight Association territory opposed the proposal for the revision of class freight rates between points in the Central Freight Association territory and points east of Buffalo and Pittsburgh, submitted by the carriers in the Central Freight Association, the Eastern Trunk Line Association and the New England Freight Association, at a meeting with the carriers at the Hotel LaSalle, Chicago, on November 14. The rates as proposed by the carriers show an advance in Classes 1, 2, 3 and 4 of from 9 to 19 cents per hundred pounds from Chicago to New York, Boston, Mass., Philadelphia, Pa., Baltimore, Md., and other points and in Classes 5 and 6 a reduction of from 1½ cents to 2½ cents eastbound. Westbound Classes 1, 2, 3 and 4 show an increase of from 7 to 28 cents per hundred pounds and Classes 5 and 6 a reduction of from ½ cent to 2 cents per hundred pounds. The shippers suggested that the carriers consider the shippers' opposition and that a conference of shippers and carriers be held sometime before the hearings take place before the Interstate Commerce Commission.

The chief spokesman for the roads was R. N. Collyer, chairman of the Trunk Line Association. J. P. Haynes, traffic director of the Chicago Association of Commerce, acted as chairman of the committee representing the shippers. Eugene Morris, chairman of the Central Freight Association, presided at the meeting.

Mr. Collyer said that this question dates back to 1917 when the adjustment at that time left irregularities in rates on certain commodities and the complaints of shippers to the Interstate Commerce Commission resulted in an order for the revision of rates. He also said that some of the counter-proposals offered by the shippers, if put into effect, will eventually cause some of the roads to withdraw from competition between certain points.

Equipment and Supplies

Locomotives

THE MISSOURI-KANSAS-TEXAS, reported in the *Railway Age* of November 15 as inquiring for 10 eight-wheel switching locomotives, has ordered them from the Lima Locomotive Works.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of November 1 as contemplating buying 18 locomotives, is now inquiring for 18, 2-10-2 type locomotives, with tenders having a capacity of 12,000 gal.

Freight Cars

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 200 underframes.

THE FLORIDA EAST COAST is inquiring for 10 tank cars of 10,000 gal. capacity.

THE GRAVER CORPORATION has ordered 2, 60-ft. flat cars from the Illinois Car & Manufacturing Co.

ARMOUR & COMPANY, Chicago, has ordered 150 steel underframes from the Illinois Car & Manufacturing Co.

THE GRAND TRUNK has ordered 25 steel underframes for caboose cars from the American Car & Foundry Co.

THE NEW JERSEY, INDIANA & ILLINOIS has ordered 200 automobile cars from the American Car & Foundry Co.

THE MCKINNEY STEEL COMPANY has ordered 10 flat cars of 100 tons' capacity from the Pressed Steel Car Company.

THE BALTIMORE & OHIO is expected to enter the market about the first of the year for box, gondola and flat cars, totaling 5,000.

THE GREAT NORTHERN is inquiring for 500 underframes. This is in addition to the inquiry for 1,000 underframes, reported in the *Railway Age* of November 8.

THE ELGIN, JOLIET & EASTERN, reported in the *Railway Age* of November 15 as inquiring for 500 steel underframes, will build these underframes in its own shops.

Passenger Cars

THE NEW YORK CENTRAL has ordered one combination passenger and baggage car, one passenger trailer car and one combination baggage and mail motor car, from the J. G. Brill Company.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has placed an order with the Sykes Company, St. Louis, Mo., for four combination mail and express motor coaches with trailers accommodating 60 passengers and one combination baggage and passenger motor coach.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of September 6, as inquiring for 130 suburban motor coaches and 85 suburban trailers, has ordered the motor coaches from the Pullman Car & Manufacturing Company and the trailers from the Standard Steel Car Company. Contracts for the electric control equipment were awarded to the General Electric and the Westinghouse Electric & Manufacturing Companies.

Iron and Steel

THE ERIE has received bids on 1,200 tons of steel for a bridge at Paterson, N. J.

THE NEW YORK CENTRAL has received bids on 500 tons of steel for a bridge near Buffalo.

THE ST. LOUIS-SAN FRANCISCO has ordered 15,000 tons of rail from the Illinois Steel Company.

THE CHESAPEAKE & OHIO has ordered 6,000 tons of rail from the Bethlehem Steel Corporation.

THE DELAWARE, LACKAWANNA & WESTERN has received bids on 250 tons of steel for signal bridges.

THE NORFOLK & WESTERN has received bids on 500 tons of structural steel, for a machine shop extension at Roanoke, Va.

THE BALTIMORE & OHIO has ordered 4,000 tons of rails from the Illinois Steel Company and 20,000 tons from the Carnegie Steel Company.

THE BALTIMORE & OHIO has ordered 200 tons of structural steel for a bridge in Maryland from the American Bridge Company and about 500 tons for grade elimination work in Staten Island has been ordered from the McClintic-Marshall Company.

THE CHICAGO, MILWAUKEE & ST. PAUL, reported in the *Railway Age* of November 15 as having ordered 28,000 tons of rails from the Illinois Steel Company, has increased this order to 40,000 tons and also has ordered 10,000 tons from the Inland Steel Company.

THE ATCHISON, TOPEKA & SANTA FE has placed orders for 85,000 tons of rail, the largest part of which went to the Colorado Fuel & Iron Company, and the remainder was distributed between the Bethlehem Steel Corporation, the Inland Steel Company and the Illinois Steel Company.

Machinery and Tools

THE LEHIGH VALLEY placed orders recently for a number of machine tools including lathes, etc.

Miscellaneous

THE CHICAGO & NORTH WESTERN has placed an order with the Oneida Manufacturing Company, Green Bay, Wis., for the installation of power units on a combination car.

THE GREAT NORTHERN has ordered one combined locomotive crane and ditcher of 30 tons' capacity from the Industrial Works, Bay City, Mich., and one Jordan spreader from the O. F. Jordan Company, East Chicago, Ind.

Signaling

THE KEIHIN ELECTRIC RAILWAY (Japan), has bought from the Union Switch & Signal Co., 700 Keystone insulated rail joints.

THE GOVERNMENT RAILWAYS of Japan have ordered from the Union Switch & Signal Co., 287 color light signals and accessories.

THE PENNSYLVANIA has ordered from the Union Switch & Signal Co. an additional 12 levers for the Saxby & Farmer interlocking at Indiana Harbor, Ind.; also material for important additions to the interlocking at Fort Wayne, Ind., Steubenville, Ohio, and Uhrichsville, Ohio.

THE BALTIMORE & OHIO has placed an order with the Hall Switch & Signal Company, Garwood, N. J., for 77 position color-light signals. Sixty-five will be high type and 12 dwarf type. All of these will be installed by the railroad company forces on the Staten Island Rapid Transit in connection with electrification work now in progress. The first installation of position color-light signals furnished by Hall Company is now in service on the Baltimore & Ohio between Hamler, Ohio, and Deshler.

THE NUMBER OF EMPLOYEES of the Louisville & Nashville now wearing the buttons and pins awarded by the company in recognition of long service is 7,619. These badges, first adopted in 1922, are designed to recognize five different terms of service, as indicated below; and the men and women now entitled to this honor in the different classes are listed as follows:

MEN—			
15 Years	Bronze buttons		4,897
25 Years	Silver buttons		1,715
35 Years	Silver and enamel buttons		757
45 Years	Gold and enamel buttons		122
50 Years	Gold and diamond buttons		54
WOMEN—			
15 Years	Bronze service pins		56
25 Years	Silver service pins		15
35 Years	Silver and enamel pins		3
			7,619

Supply Trade News

The Economy Electric Devices Company, Chicago, has been appointed central western sales representative of the **Chausse Oil Burner Company.**

J. D. Purdy, who has been chief draftsman of the **Pilliod Company** for many years at Swanton, Ohio, has been appointed mechanical engineer, with office at the same location.

The National Malleable & Steel Castings Co., Cleveland, O., is constructing an annealing plant 100 by 500 ft. in Indianapolis, Ind.

The New York City office of the **Joyce-Cridland Company** is now at 105 West Fortieth street. **Arthur S. Beattys** is eastern sales manager.

The Kalman Steel Company has removed its office from the Merchants National Bank building, St. Paul, Minn., to the Builders Exchange building, Sixth and Jackson streets.

Arthur J. Manson, manager of the transportation division, railway department, of the New York office of the Westinghouse Electrical & Manufacturing Company, has been appointed to the position of manager of the heavy traction division, railway department, at Pittsburgh, Pa., effective November 1. After being graduated from the Massachusetts Institute of Technology in 1905, he entered the company's engineering apprentice course and assisted in the building and testing of the first electric locomotive for the New York, New Haven & Hartford. In the spring of 1907 he was assigned to the electrification work on this road and aided in the inauguration of the electric service. In this position he instructed the steam enginemen in their duties as electric enginemen. Mr. Manson was associated with the preliminary test conducted by the Pennsylvania Railroad on Long Island prior to the decision as to the system to be used in the Pennsylvania tunnels entering New York City. Later he became associated with F. H. Shepard, director of heavy traction, entering the New York office of the Westinghouse Company. He assisted Mr. Shepard in connection with the Pennsylvania contract for power house, substation and locomotives for the Pennsylvania New York tunnel electrification. In 1910 Mr. Manson entered the sales department of the New York office following construction, subway and elevated work. In 1920 he was made manager of the transportation division of the New York office which position he held at the time of his recent appointment. During the time when Mr. Manson was manager of the transportation division he wrote and published a book entitled Railway Electrification.

A. J. Manson

The White Campany, Cleveland, Ohio, will construct an engineering and research building 160 by 150 ft. one story in height with a second story at one end and a basement floor opposite its present plant in Cleveland. All engineering activities will be centralized in the new building.

G. E. Emmons, vice-president in charge of manufacturing of the **General Electric Company,** Schenectady, N. Y., who has been identified with the electrical industry since 1886, has asked to be relieved of the responsibilities of his position and plans to soon move from Schenectady to Pasadena, Cal.

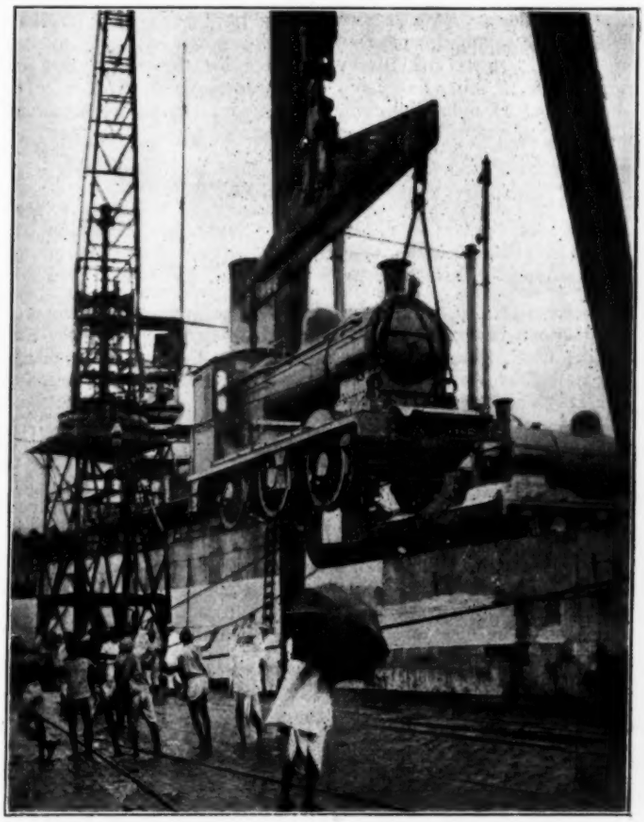
Tom Moore, 811 Royster building, Norfolk, Va., has been appointed railroad sales agent in the southeastern district for the **American Bolt Corporation,** New York. He will conduct the sales activities in the railroad and industrial field. Mr. Moore was formerly general purchasing agent of the Virginian Railway.

E. B. Perry, vice-president and general manager of the **Industrial Works,** with headquarters at Bay City, Mich., has been elected president and general manager to succeed **W. L. Clements** who has been elected a member of the board of directors. **H. H. Perry,** assistant to the vice-president and general manager, has been promoted to manager. **C. R. Wells,** secretary and treasurer, has been elected a member of the board of directors and will be succeeded by **N. D. Platt,** office manager, who in turn will be succeeded by **J. L. Trudell,** advertising manager, who will be succeeded by **A. R. Olson. Walter Perry,** superintendent, has been promoted to general superintendent.

Obituary

Herbert M. Aubrey, sales representative of the Union Asbestos & Rubber Co., Chicago, with headquarters at Denver, Colo., died in Denver on November 7.

E. A. Gregory, district sales manager of the American Brake Shoe & Foundry Co., with headquarters at Houston, Texas, died on November 1, in a hospital in New York. Mr. Gregory was born in Nashville, Tenn., on March 22, 1877. He entered railroad work in 1900 with the Nashville, Chattanooga & St. Louis and in 1903 was appointed foreman of terminals of the Louisville & Nashville, at Nashville, Tenn. He remained in that position until January, 1909, when he went to the American Brake Shoe and Foundry Co. On March 1, 1923, he was appointed district manager, with headquarters at Houston, Texas.



Unloading Locomotives for East India Railway—Built by Sir W. G. Armstrong-Whitworth Co., Ltd., Newcastle-upon-Tyne, England

Railway Construction

CENTRAL OF NEW JERSEY.—This company has awarded a contract to Henry Steers, Inc., for the construction of viaduct piers at the east end of its new bridge over Newark bay; estimated cost, $152,820.

CHICAGO, ROCKPORT & OWENSBORO-ELECTRIC.—This company plans the construction of an electric railroad approximately 90 miles long from Elnora, Ind., to Owensboro, Ky. The new line will connect with the Chicago, Milwaukee & St. Paul at Elnora and with the Southern at Tennyson, Ind. Application for authority to construct the line will be made to the Interstate Commerce Commission in the near future.

DELAWARE, LACKAWANNA & WESTERN.—This company has awarded a contract to the Chicago Bridge & Iron Works for the furnishing and erection of a 200,000-gal. steel tank at the engine terminal now under construction at Binghamton, N. Y.

DENVER & SALT LAKE WESTERN.—This company, which was recently incorporated at Denver, Colo., plans the construction of a connecting line from Dotsero, Colo., on the Denver & Rio Grande Western to Orestod on the Denver & Salt Lake, a distance of 41 miles. The construction of the cut off will open up a new line between Denver and Salt Lake City, comprising the Denver & Salt Lake from Denver to Orestod, the Denver & Salt Lake Western from Orestod to Dotsero and the Denver & Rio Grande Western from Dotsero to Salt Lake City, shortening the distance between Denver and Salt Lake City via the D. & R. G. W. by 149 miles. W. R. Freeman, receiver of the Denver & Salt Lake, is one of the incorporators.

ILLINOIS CENTRAL.—This company has awarded a contract to John Marsh, Chicago, for the construction of section No. 2 of its 165-mile cut-off line from Edgewood, Ill., to Fulton, Ky. Section No. 2 extends from the Marion County, Ill., line to Akin Junction, a distance of approximately 35 miles. A contract has been awarded to T. E. Shugart and Blythe Brothers for the construction of section No. 3 extending from Akin Junction, Ill., to Benton, a distance of 15 miles. Section No. 4 from Benton to Big Four Crossing, 25 miles, has not yet been let.

MISSOURI PACIFIC.—This company plans the construction of a fuel oil station at Ewing avenue, St. Louis, Mo.

MISSOURI PACIFIC.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension of the Eudora branch from Epps to Delhi, La., 10.5 miles.

OWENSBORO, ROCKPORT & CHICAGO.—The Interstate Commerce Commission has made public a proposed report by Attorney-Examiner C. E. Boles and Engineer-Examiner E. Gray, recommending a finding by the commission that the public convenience and necessity do not require the construction of the proposed line from Owensboro, Ky., to Elnora, Ind., 84 miles.

PENNSYLVANIA.—This company has awarded a contract to George F. Dobbin, Philadelphia, for the construction of an undergrade bridge at Erie avenue, Philadelphia. The work will cost approximately $60,000, to be shared in by the city of Philadelphia.

PENNSYLVANIA.—This company has authorized the erection of a coal-dumping machine at its docks at Sandusky, Ohio, to cost $805,000, including track and dock revisions and installation of the machine. The new machine will have a dumping capacity of 40 cars of coal an hour.

PERE MARQUETTE.—This company, jointly with the Grand Trunk Western, contemplates the construction of a union station at Flint, Mich.

SOUTHERN PACIFIC.—This company plans the immediate construction of an l.c.l. freight station at 51st and Alameda streets, Los Angeles, Calif. The freight house will be 30 ft. by 164 ft. with platform long enough to accommodate 14 cars. A house track 1,440 ft. long and a team track 1,290 ft. long, will also be constructed.

Railway Financial News

ALABAMA GREAT SOUTHERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority nominally to issue $500,000 of 5 per cent first consolidated mortgage bonds.

ALABAMA & VICKSBURG.—*Change of Control.*—100 *Per Cent Dividend Planned.*—The controlling interest of the Sterling Trust Company, Ltd., an English company, in the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific Railways has passed into the hands of a financial group of New York and New Orleans, headed by Spencer Trask & Co.

The directors have recommended to the stockholders that the stock of the company be increased 100 per cent, to be used for a dividend at the rate of one additional share for each share now held. A meeting of stockholders has been called for December 10 to authorize the increase and stock dividend distribution.

BANGOR & AROOSTOOK.—*Bonds.*—The Interstate Commerce Commission has authorized the authentication and delivery of $204,000 of Northern Maine Seaport first mortgage 30-year 5 per cent bonds, to be guaranteed by the Bangor & Aroostook.

Stock Sold.—Hornblower & Weeks have sold 72,178 shares of Bangor & Aroostook stock at $42.50 per share, to yield approximately 7 per cent. The stock was part of a total of 77,200 shares of $50 par value outstanding purchased by the bankers from the Aroostook Construction Company.

CAROLINA, CLINCHFIELD & OHIO.—*Stock Sold.*—Subscription books have been closed on the 126,000 shares of Carolina, Clinchfield & Ohio leased line stock offered by Blair & Co., Inc., Brown Brothers & Co., The Equitable Trust Co. of New York, White, Weld & Co., Ladenburg, Thalmann & Co., Cassatt & Co., Redmond & Co., Graham, Parsons & Co. and Joseph Walker & Sons.

CHICAGO & NORTH WESTERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to draw down $1,904,000 of first refunding 5 per cent bonds and $1,656,000 of general mortgage 5 per cent bonds, to reimburse the treasury for expenditures to retire underlying bonds.

CHICAGO, PEORIA & ST. LOUIS.—*Sale*—Seven prospective bidders were qualified to make their bids when the sale of this property is held at Springfield, Ill., on November 20. Two of the prospective bidders had qualified to bid on the railway as a whole while the other five were permitted to bid on various portions of the property. Identities of seven prospective bidders were not known before that sale but it was understood that one bid would be made by the Equitable Trust Company of New York, representing bondholders.

CHICAGO, ROCK ISLAND & PACIFIC.—*Acquisition—Bonds.*—See St. Paul & Kansas City Short Line item below.

DELAWARE & HUDSON.—*Valuation.*—The United States Supreme Court on November 18 heard arguments on the appeal taken by the railroad company from the decision of the supreme court of the District of Columbia denying the application for an injunction restraining the Interstate Commerce Commission from proceeding with its valuation of the company's properties along the lines of its tentative report.

DENVER & RIO GRANDE WESTERN.—*Receivership Sale.*—The Federal Court at Denver, Colo., has denied the application of Harold Palmer, consulting engineer of New York, in which he sought to have the sale of this company set aside on the grounds that there was no necessity to sell the road as it was paying well now. Notice was given that the case will be appealed to the Federal Circuit Court of Appeals.

GEORGIA SOUTHERN & FLORIDA.—*Securities.*—The Interstate Commerce Commission has authorized an issue of $1,280,000 of 4½ per cent equipment trust certificates, which have been sold to Spencer, Trask & Co., at 96½. The company has applied for

authority for an unsecured promissory note for six months for $350,000 to the United States Trust Company of New York.

KANSAS CITY SOUTHERN.—*Acquisition.*—The Interstate Commerce Commission has authorized the acquisition of sole control of the Kansas & Missouri Railway & Terminal Company by purchase of its capital stock.

MISSOURI-KANSAS-TEXAS.—*Preferred Dividend.*—The directors will consider the question of inaugurating dividends on the preferred stock at their meeting December 15. The executive committee has recommended the payment of dividends at the rate of 5 per cent per annum on the preferred stock as soon as the year's results had been definitely ascertained. The committee felt that, although the results might warrant a larger distribution, it was better policy at this time to await the results of 1925 before paying dividends at the full rate of 7 per cent per annum.

MONONGAHELA CONNECTING.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Eastern Railroad through purchase of its stock.

NEW ORLEANS, TEXAS & MEXICO.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $3,752,000 of first mortgage 5½ per cent bonds, and to sell them, together with $981,000 of first mortgage 5 per cent bonds, at not less than 99 and 92 respectively, and pending their sale, to pledge them as collateral for short term notes.

NEW YORK CENTRAL.—*Acquisition.*—This company has been authorized by the Interstate Commerce Commission to acquire control of the Hudson River Connecting Railroad.

ST. PAUL & KANSAS CITY SHORT LINE.—*Acquisition.*—The Interstate Commerce Commission has authorized this company to acquire a line formerly owned by the Keokuk & Des Moines and also the acquisition by the Chicago, Rock Island & Pacific, by lease, of the line upon its acquisition by the St. Paul & Kansas City. The Rock Island was also authorized to exchange $2,694,000 of first and refunding mortgage 4 per cent gold bonds at par for a like amount of bonds of the Keokuk & Des Moines and to guarantee a like amount of 4½ per cent bonds of the St. Paul & Kansas City Short Line. The latter was authorized to issue $2,694,000 of first mortgage 4½ per cent bonds and $182,200 of capital stock to be delivered to the Rock Island.

VICKSBURG, SHREVEPORT & PACIFIC.—*Stock Sold.*—Spencer Trask & Co., of New York, the Canal-Commercial Trust & Savings Bank of New Orleans and Eustis Jones, New Orleans, have sold $2,080,100 preferred stock and $2,773,500 common stock of the Vicksburg, Shreveport & Pacific. The preferred stock, which carries with it 5 per cent non-cumulative dividends was offered at 72, while the common stock, which is now paying 4 per cent, was offered at 57. According to the announcement of the bankers, the offering comprises 97 per cent of the entire outstanding capital stock of the company and includes all the stock recently acquired by the group from the Sterling Trust, Ltd., of London.

Dividends Declared

Alabama Great Southern.—3½ per cent, payable December 26 to holders of record November 26; preferred, 3½ per cent, payable February 16 to holders of record January 16.

Canadian Pacific.—Common, 2½ per cent, quarterly, payable December 31 to holders of record December 1.

Chesapeake & Ohio.—Common, 2 per cent, semi-annually; preferred, 3¼ per cent, semi-annually; both payable January 1 to holders of record December 5.

Chestnut Hill.—1½ per cent, quarterly, payable December 4 to holders of record November 20.

Delaware & Bound Brook.—2 per cent, quarterly, payable November 20 to holders of record November 19.

Midland Valley.—Preferred, 2½ per cent, semi-annually, payable December 1 to holders of record November 22.

Philadelphia, Germantown & Norristown.—3 per cent, quarterly, payable December 4 to holders of record November 20.

Southern Pacific.—1½ per cent, quarterly, payable January 2 to holders of record November 28.

Union Pacific.—Common, 2½ per cent, quarterly, payable January 2 to holders of record December 1.

Trend of Railway Stock and Bond Prices

	Nov. 18	Last Week	Last Year
Average price of 20 representative railway stocks	77.91	76.29	60.99
Average price of 20 representative railway bonds	88.92	89.21	82.42

Railway Officers

Financial, Legal and Accounting

William R. McFeeters, attorney for the Central Vermont, with headquarters at St. Albans, Vt., has resigned to enter private practice at St. Albans, effective November 1.

Operating

A. A. Parish has been appointed assistant trainmaster of the Virginia division of the Seaboard Air Line, with headquarters at Raleigh, N. C.

D. T. Murray, general agent, operating department, of the New York Central, with headquarters at Youngstown, Ohio, has retired after 59 years of railway service.

Robert Faries, division engineer of the Pittsburgh division of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been promoted to superintendent of the Buffalo division, Central region, with headquarters at Buffalo, N. Y., succeeding E. B. Whitman, resigned.

Frank I. Snyder, assistant general manager of the Bessemer & Lake Erie, with headquarters at Pittsburgh, Pa., has been promoted to general manager, with the same headquarters, succeeding Edward H. Utley, whose death on November 8 was announced in the *Railway Age* of November 15.

C. F. Donnatin, superintendent of the San Joaquin division of the Southern Pacific, with headquarters at Bakersfield, Calif., has been transferred to the Salt Lake division, with headquarters at Ogden, Utah, succeeding **W. L. Hack,** who succeeds Mr. Donnatin as superintendent of the San Joaquin division.

H. N. Walters has been appointed trainmaster of the Northern division of the Chesapeake & Ohio, with headquarters at Chillicothe, Ohio. **J. R. Cary, Jr.,** assistant trainmaster and assistant road foreman of engines, with headquarters at Russell, Ky., has been transferred to St. Albans, W. Va., in the same capacity. **H. E. Bess** succeeds Mr. Cary as assistant trainmaster and assistant road foreman of engines at Russell. **H. T. Manlove** has been appointed chief train dispatcher, with headquarters at Covington, Ky., succeeding **E. H. Edsall,** assigned to other duties.

John W. Payne, whose promotion to superintendent of the Memphis division of the Southern, with headquarters at Sheffield, Ala., was reported in the *Railway Age* of November 1, was born at Scottsboro, Ala., on July 16, 1883. He entered railway service in April, 1898, as a yard clerk on the Memphis & Charleston, now part of the Southern. He became a locomotive fireman in August, 1901, and in January, 1906, was promoted to locomotive engineman. Mr. Payne was promoted to general yardmaster at Loyall, Ala., in April, 1918, and a month later was promoted to trainmaster of the Memphis division. He continued in that position until his recent promotion to superintendent of the Memphis division.

William A. Hamler, whose promotion to superintendent of the Ontario division of the New York Central, with headquarters at Oswego, N. Y., was announced in the *Railway Age* of November 1, was born near Philipsburg, Pa., on November 27, 1878. He received a common school education and entered railway service on December 26, 1891, as a telegraph operator for the Beech Creek, which is now a part of the New York Central. He became train dispatcher of the New York Central at Jersey Shore, Pa., on October 9, 1900, and on November 1, 1904, he was promoted to chief train dispatcher at the same place. He was promoted to assistant trainmaster on October 1, 1907, and on May 4, 1912, he was promoted to trainmaster at Jersey Shore, serving in that capacity also at Corning and Buffalo, N. Y. Mr. Hamler was promoted to assistant superintendent at Jersey Shore on May 1, 1917, and remained in

that capacity until his promotion to superintendent of the Ontario division.

David T. Hanna, whose promotion to superintendent of the Adirondack and Ottawa divisions of the New York Central, with headquarters at Utica, N. Y., was announced in the *Railway Age* of November 1, was born in August, 1863, at Dover Plains, N. Y. He entered railway service on March 5, 1880, as a freight brakeman on the Harlem division of the New York Central and in 1887 he became freight conductor. In 1894 he became passenger conductor of the same division and a short time thereafter he became yard master at Melrose Junction, N. Y. He was appointed night agent at the Grand Central station, New York, in 1901 and in 1904 he was promoted to assistant station master. Mr. Hanna was promoted to trainmaster of the Harlem division in 1907 and in 1917 he was promoted to assistant superintendent of the Hudson division at New York, which position he held at the time of his promotion. Mr. Hanna's entire railway service has been with the New York Central.

Mechanical

J. S. Ford, road foreman of engines on the Chicago, Burlington & Quincy, with headquarters at Aurora, Ill., has been promoted to assistant master mechanic of the Galesburg division, with headquarters at Galesburg, Ill., a newly created position.

Thomas Paxton, superintendent of motive power of the El Paso & Southwestern, whose retirement from railway service was reported in the *Railway Age* of November 8, was born on January 30, 1855, in Hampshire county, Virginia, and entered railway service in 1873 as a machinist apprentice on the Baltimore & Ohio. From September, 1879, to April, 1884, he was employed as a machinist on the Texas & Pacific; the St. Louis, Iron Mountain & Southern, now a part of the Missouri Pacific; the Pennsylvania and the Wabash. He was appointed roundhouse foreman on the Atchison, Topeka & Santa Fe in April, 1884, and held that position until April, 1889, when he was promoted to master mechanic of the Argentine terminal. Mr. Paxton was transferred to the Middle division in September, 1889, and continued in that capacity until February, 1897, when he was transferred to the Chicago division. He was promoted to general master mechanic of the Texas lines in February, 1901, and in February of the following year, was appointed superintendent of motive power of the Colorado & Southern. Mr. Paxton was appointed master mechanic of the Central division of the St. Louis-San Francisco in April, 1903. In February, 1904, he was appointed master mechanic at the Baring Cross shops of the Missouri Pacific at Little Rock, Ark., and held that position until August, 1904, when he was appointed master mechanic of the El Paso & Southwestern. He was promoted to superintendent of motive power on June 1, 1905, and remained in that position until his recent retirement.

Engineering, Maintenance of Way and Signaling

J. L. Campbell, chief engineer of the El Paso & Southwestern, with headquarters at El Paso, Tex., has been appointed assistant to the chief engineer of the Southern Pacific, with headquarters at San Francisco, Cal., a newly created position. This is pursuant to the acquisition of the El Paso & Southwestern by the Southern Pacific.

R. E. Dougherty, whose promotion to special engineer to the vice-president of the New York Central, with headquarters at New York, was announced in the *Railway Age* of November 1, was born at New York on February 13, 1880, and was graduated from the Columbia university in 1901. He entered railway service with the New York Central on September 30, 1902, as a rodman and was subsequently promoted to transitman and inspector and assistant engineer on construction on the Middle district. In December, 1904, he was appointed assistant engineer on grade crossing elimination, yard design, etc., with headquarters at New York, serving in this capacity until September, 1905, when he was promoted to resident engineer in charge of construction of the Eastern district. In 1907 he was promoted to assistant district engineer, serving in this capacity until 1910 when he was promoted to district engineer. In 1918 he was promoted to designing engineer with jurisdiction over the Lines East of Buffalo and with headquarters at New York, remaining in this position until his recent promotion to the position of special engineer to the vice-president.

Purchasing and Stores

James E. Kilborn, purchasing agent of the Rutland, with headquarters at Rutland, Vt., has resigned, effective November 15.

Obituary

Maham H. Haig, master mechanic of the Pecos division of the Atchison, Topeka & Santa Fe, with headquarters at Clovis, N. M., died from pneumonia on November 10. Mr. Haig was born on July 9, 1878, at Charleston, S. C., and was graduated from Cornell university in 1900. He entered railway service in July of that year as a machinist apprentice for the Illinois Central and later served as a machinist and foreman for the same company. In April, 1906, he resigned to become editor of the Railway Master Mechanic and in February, 1909, he re-entered railway service to become betterment assistant for the Atchison, Topeka & Santa Fe, where he was engaged in the betterment work of the bonus department. Mr. Haig later entered the motive power department and on December 1, 1909, he was promoted to mechanical engineer, with headquarters at Topeka, Kans. During the latter part of 1921 he was appointed master mechanic of the Pecos division, which position he held at the time of his death.

M. H. Haig

John M. Meade, formerly engineer of the Eastern lines of the Atchison, Topeka & Santa Fe, whose death on October 31 was reported in the *Railway Age* of November 8, was born on November 1, 1853, at Nineveh, Pa., and entered railway service in June, 1873, as a chainman on the Baltimore & Ohio. In May, 1877, he was appointed chief clerk to the superintendent of bridges and buildings of the Atchison, Topeka & Santa Fe, and in June of the following year was promoted to foreman of the lumber yard. Mr. Meade was promoted to assistant division engineer in April, 1881, and in November, 1881, was promoted to resident engineer. He was appointed assistant engineer in charge of engineering work in the operating department for the entire system in May, 1886, and in August of the following year was appointed assistant engineer of the Eastern division in charge of bridges, buildings and water service. Mr. Meade was appointed resident engineer at Topeka, Kans., on March 1, 1888, and held that position until July, 1893, when he was transferred to the Western Grand division. He later served as resident engineer on the Middle and Eastern division and the Chicago and Eastern division, remaining in the latter position until July, 1903, when he was promoted to acting engineer of the Eastern Grand division. Mr. Meade was promoted to engineer of the Eastern Grand division in July, 1904, and in April, 1909, he was promoted to engineer of the Eastern lines, with headquarters at Topeka, Kans. He was appointed special engineer of the entire Santa Fe system on July 1, 1915, and remained in that position until his retirement from active service in June, 1919. He was active in the Roadmasters' Association, having been president of that organization in 1901.